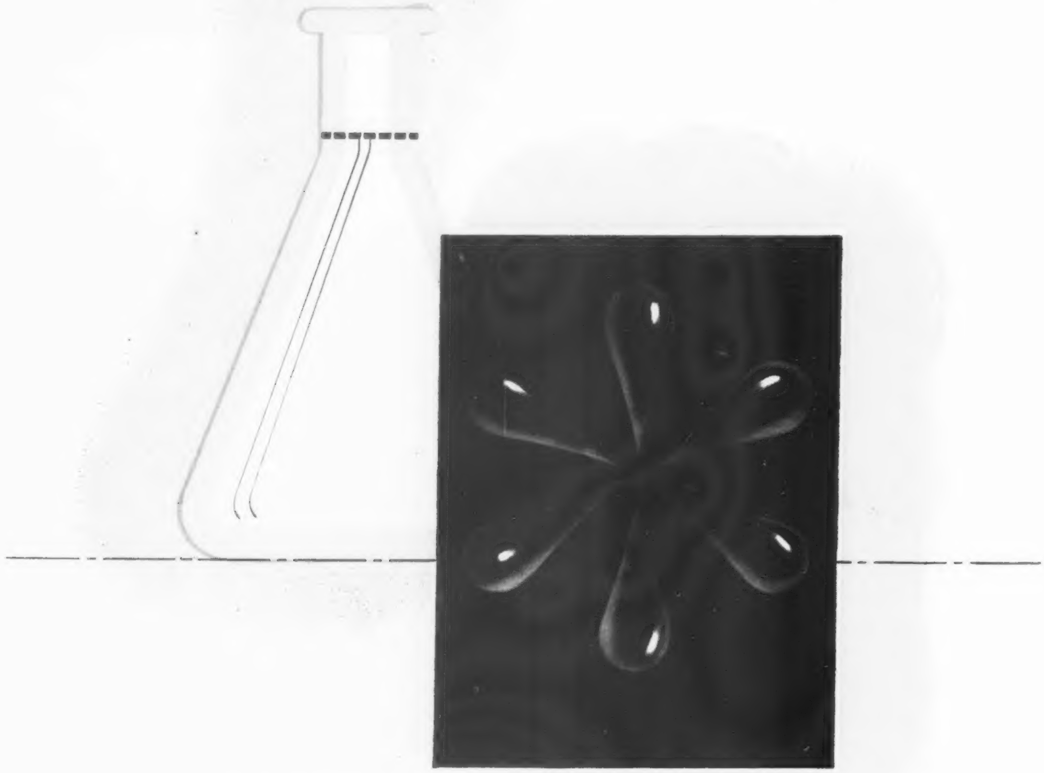
PAINT and VARNISH Production

THE TECHNICAL MAGAZINE FOR MANUFACTURERS OF PAINT, VARNISH, LACQUER AND OTHER SYNTHETIC FINISHES



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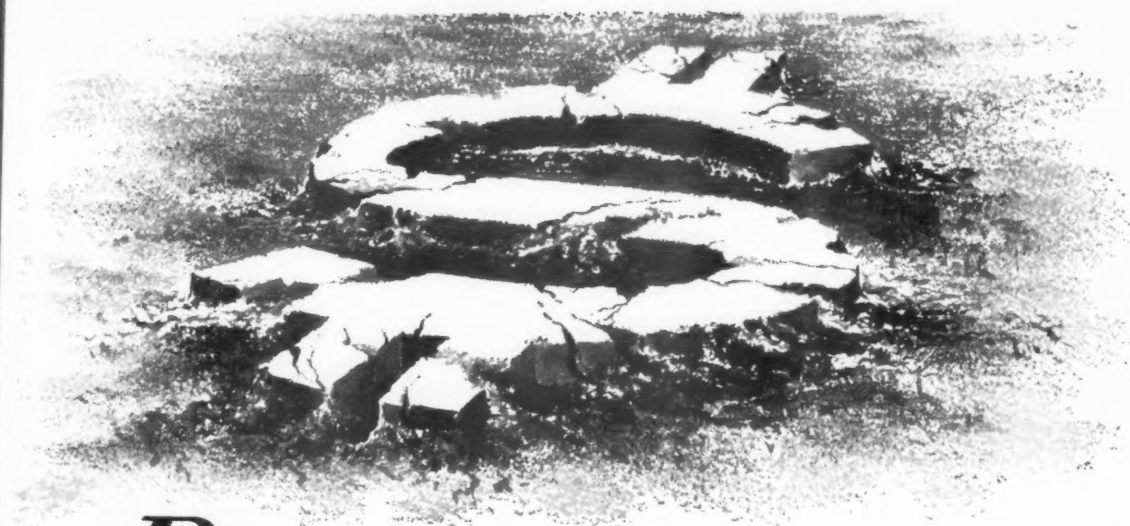

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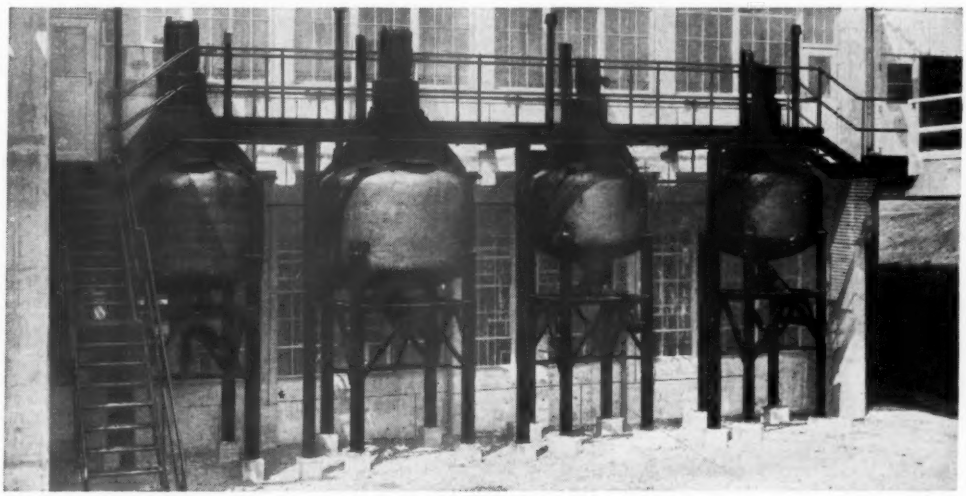

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Formerly PAINT and VARNISH PRODUCTION MANAGER

(Established in 1910 as The Paint and Varnish Record)

VOL. 48 JANUARY, 1958 NO. 1

NEXT ISSUE

In February we will feature an article dealing with water sorption of low opacity pigments in vinyl and acrylic latex paints. In this article emulsion technology is employed to describe a method for measuring the water sorption of low opacity pigments.

FEATURES

DEPARTMENTS

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Editorial Comment

January, 1958

No Need for Panic

THE Federal Reserve announcement in late November to reduce its discount rates was a clear indication that the economy had lost some of its steam. The downward trend which started in the early months of 1957 was viewed by most business men as a temporary development and would be followed by a brisk pickup in the autumn months. However, the record shows that the upturn hoped for never did materialize.

This decline in business activity has been described by leading economists as a mild rolling readjustment in our economy, and will dominate our economy through the first half of 1958. The second half should bring an upgrade trend with business activity again moving at a high rate.

The present readjustment has been most pronounced in manufacturing industries where there has been lack of sufficient orders to maintain high rates of production and shipments. This is being reflected particularly in steel production.

Because of inventory-cutting policies by most manufacturers, the steel industry is currently operating between 70-75 per cent of capacity and is expected to continue at this rate during the first half of 1958.

Indications are that most businesses will be spending less for plant and equipment in 1958. Estimates put the decline between 10 and 15 per cent under 1957. As was pointed out in the First National City Bank Monthly Letter of December on Business and Economic Conditions, a 10 per cent—even a 20 per cent—cutback over the next couple of years would leave business investment higher than in 1955, which in its day set a new record.

One of the strong factors shaping the 1958 economy is the construction picture. Public works spending by federal, state and local governments is expected to increase sharply. Estimates are that these projects will total some $15 billion. As for residential construction a moderate upswing is in the offing, reaching an annual rate of 1,100,000 starts by the end of this year Looser credit and the administration plans for easier financing for modest income home buyers will have a favorable effect on the homebuilding market. According to the Department of Labor and the Department of Commerce, total expenditures for new construction will run around $49.6 billion in 1958 representing a 5 percent increase over the 1957 total.

Another development which will help retard the present slack in business is the government's new attitude on defense spending as a result of the Russian success in the missle field. Increases up to $2 billion have been urged by the Defense Department. This figure could be upped considerably depending on what action Congress will take in determining the size of the missle and other military programs.

In predicting the outlook for automobile production, one must consider the present trend in consumer spending. In recent months consumer expenditures have shifted away from durable to non-durable goods. Rising unemployment and curtailment in expansion programs of some industries are some of the factors which have contributed to the decline in retail sales.

Production of the 1958 models have been moving at a fair rate over the past few months averaging around 150,000 units per week. However, most dealers are complaining of lack of sales which they attribute to tight consumer spending and car financing difficulties. 1957 totals amounted to slightly over 6 million units, and the industry is confident that it will ship as many cars in 1958.

The present levelling off period has had at least one favorable effect on our economy—the easing of inflationary pressure. In addition, it has spurred civic construction such as highways, schools, churches, hospitals, etc. This minor setback or "breather" the nation is experiencing is no indication that an economic collapse is imminent. By all standards our economy is quite healthy and there is no need for panic.

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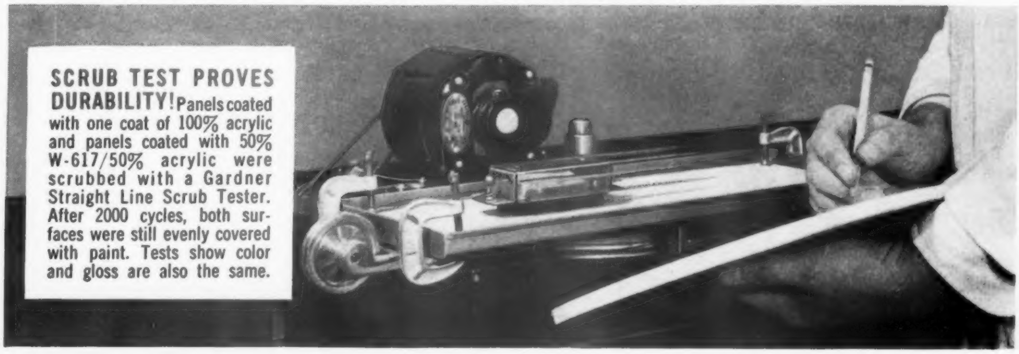

SCRUB TEST PROVES DURABILITY! Panels coated with one coat of 100% acrylic and panels coated with 50% W-617/50% acrylic were scrubbed with a Gardner Straight Line Scrub Tester. After 2000 cycles, both surfaces were still evenly covered with paint. Tests show color and gloss are also the same.

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Can your Latex formulation pass this test?

BETTER RESISTANCE TO BORATE: test panel was treated with borate solution; then coated with 2 latex paints. Note how paint based on WC-130, at left, resists the unsightly effects of borate. The commercial latex paint tested at right, shows the agglomeration possible in paints unstable to borate. Tape joint cement containing a small amount of borate will cause a build-up of small particles in the heel of the brush that will produce an unsatisfactory finish.

Test result shows that paints based on BAKELITE *Brand WC-130 Latex assure better resistance to the effects of the borate found in tape joint sealing cements and flame retardent paint formulations.*

How this test was made: Samples of a commercial latex paint and a paint based on BAKELITE WC-130 Latex were prepared and measured into separate beakers. Then equal amounts of a saturated borate solution were prepared and added slowly to each beaker. In the commercial latex paint, coagulation occurred with less than 5 cc's of the saturated borate solution, while a full 10 cc's of the borate solution were added to the WC-130 Latex based paint with no evidence of coagulation.

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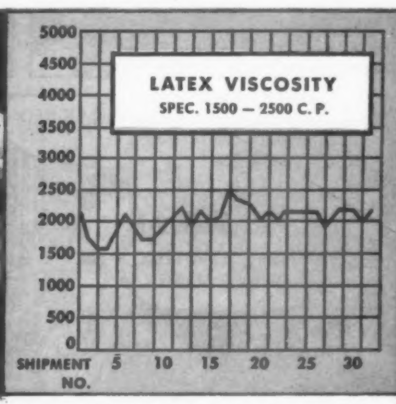

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☐ Please send formulation data *only*.

☐ Please send formulation data and sample of BAKELITE WC-130 for my comparison tests.

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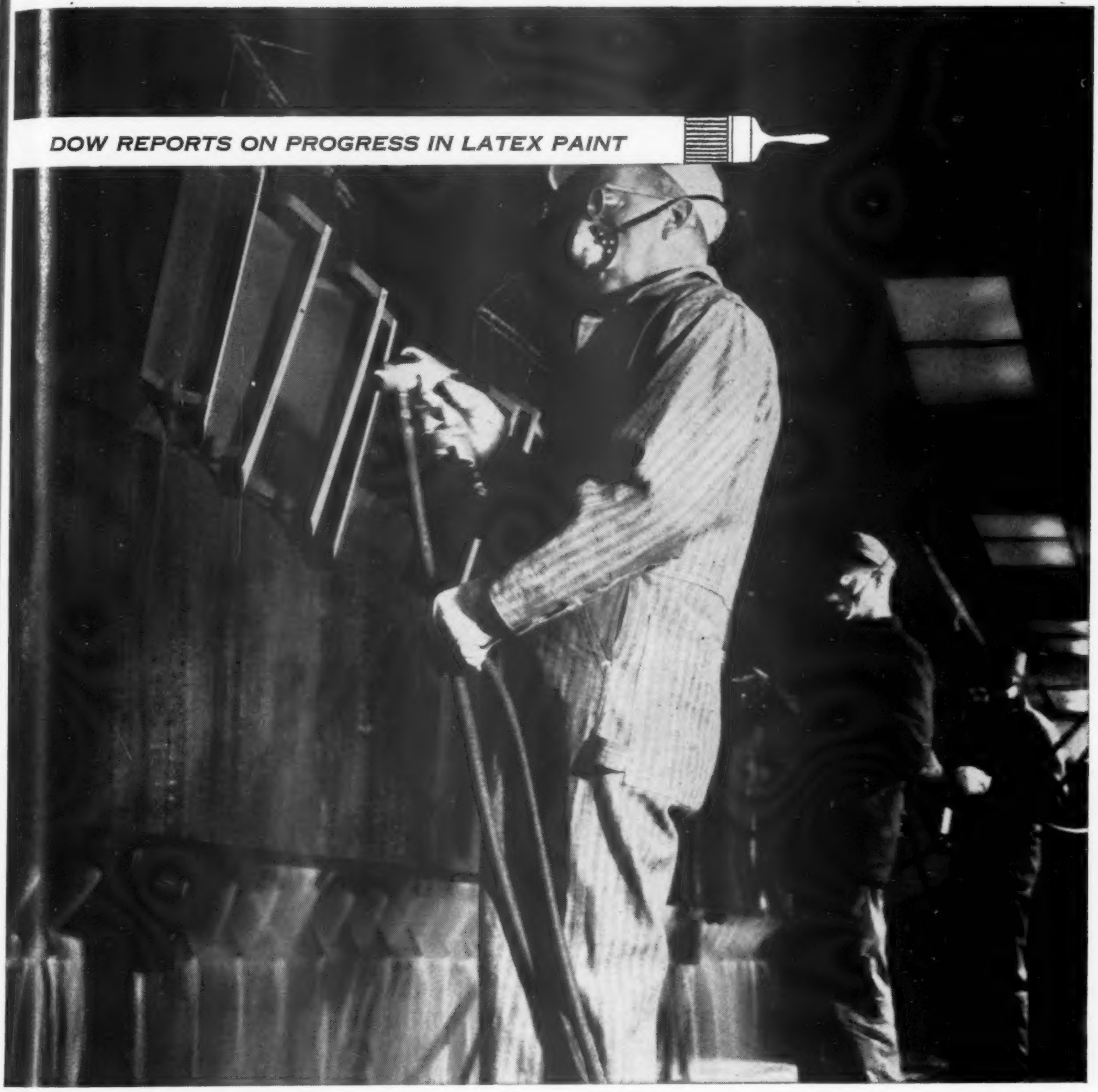
DOW REPORTS ON PROGRESS IN LATEX PAINT



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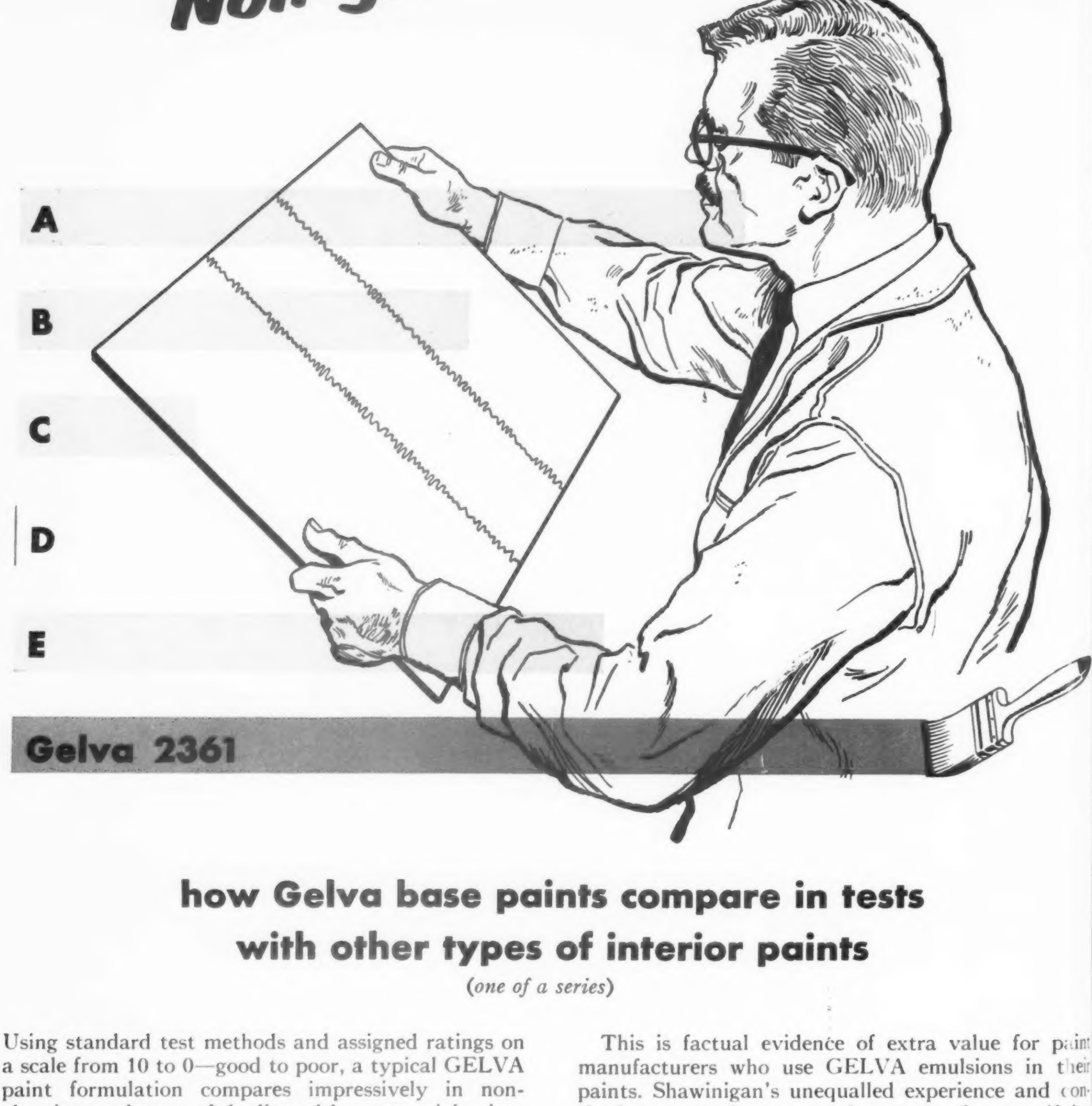

how Gelva base paints compare in tests with other types of interior paints

(one of a series)

Using standard test methods and assigned ratings on a scale from 10 to 0—good to poor, a typical GELVA paint formulation compares impressively in non-ghosting or absence of shading with commercial paints bought on the open market.

A represents a PVAc base paint
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C represents an acrylic base paint
D represents an alkyd base paint
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SHAWINIGAN RESINS

REACTIVE SILICONE RESIN INTERMEDIATES

A study of the effects of silicone content on some typical coatings.

By
S. A. Brady
J. C. Johnson
J. D. Lyons

Resistance to heat and weathering as well as film integrity and strength are qualities desirable in paint and varnish resins. Silicone-organic resin modifications are an approach to this goal. A study of some of these modifications is the subject of this paper.

SILICONE modified organic resins received little attention in the literature prior to 1946. In 1946 a patent was issued to Bowman and Evans (1) in England covering the modification of alkyds with the hydrolysis product of chlorosilanes. The hydrolysis of the chlorosilanes was carried out in an ether-water system, keeping the molecular weight of the resin product as low as possible. (Fig. 1).

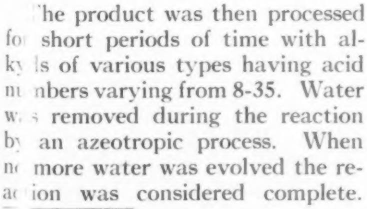


Figure 1. Hydrolysis product of phenyltrichlorosilane.

The product was then processed for short periods of time with alkyds of various types having acid numbers varying from 8-35. Water was removed during the reaction by an azeotropic process. When no more water was evolved the reaction was considered complete. The resins so obtained were applied as coating films and cured for about one hour at 150°C. The resulting films were claimed to have good heat resistance, adhesion, flexibility and resistance to water, acids and alkali.

The cobodying of the silicone and the alkyd was done in a xylene solution. No mechanism was given for the co-condensation reaction and there is some evidence that the reaction was incomplete because cloudy films were obtained in repeating this work (10). Subsequently, Glaser (2) proposed that the excess hydroxyl groups of the alkyd polyol reacted with the silanol groups of the silicone.

$$-\overset{|}{\underset{|}{C}}-OH + -\overset{|}{\underset{|}{Si}}OH \longrightarrow -\overset{|}{\underset{|}{C}}-O-\overset{|}{\underset{|}{Si}}- + H_2O$$

Since the issuance of this patent in 1946 many other patents on the subject of silicone-alkyds have been published. Some of these patents utilize the same alcohol-silanol condensation (3-9).

In addition to these, patents have been published since 1946 which describe the reaction of the hydroxyl group of the polyol with an organoalkoxysilane (10-28).

The properties of silicone-alkyds have been reviewed in the literature by Patterson (29,30,31), who claims that their heat-resistant properties lie intermediate between those of alkyd-melamines and pure silicones. He also stated that coatings made by chemical reactions as described above are superior to cold blends of finished alkyds and silicone intermediates. Appearing more recently, reviews have been written by Hedlund (32,33) Kress and Hoppens (34), McGregor (35) and Pattison (36).

The objective of the work presented in this paper is to study the effect of silicone content on processing and properties of varous types of silicone-modified organic resins. Aside from the patent literature, only two papers have been published which relate to this problem and give any details of the synthesis of modified silicone resins. Both of these papers were the result of a research program

The authors are associated with Dow Corning Corp., Midland, Mich.

on silicone alkyds at Purdue University. The first of these papers, presented by Hiles (37), shows that heat resistance is related to the oil length and type of oil used in the alkyd. He also showed that thermal properties, such as color and gloss retention, of the silicone-alkyd are improved by increased amounts of silicone, while other thermal properties, such as craze life, decreased with increasing amounts of silicone. His results also substantiate Patterson's claim that the co-condensed products are better than the cold blends.

The second paper was a thesis by Abdul-Karim (38). This paper was a study of the composition of the alkyd and a continuation of Hiles' work on the effect of silicone content. He found that a silicone content of from 50-60% gave the best films and that isophthalic acid gave better heat resistance than phthalic anhydride. He also substantiated Hiles' work concerning the better heat stability imparted to a film by using a short-chain fatty acid to modify the alkyd. Both of these papers used alkoxy-polysiolxane intermediates rather than the silanol type silicone.

SELECTION OF SILICONE

In selecting a silicone for the widest application as described in this paper many factors were considered. Polysiloxane resin properties are determined primarily by the type and number of substituent hydrocarbon groups on silicon. The type of group is important. For example, the hydrolysis of CH_3SiCl_3 gives a hard gel. If the methyl is replaced by ethyl or propyl, the product is a soft resin. If the group is octyl, the product is an oily resin and if the group is octadecyl, the product is a waxy resin. If the group is phenyl, a hard, brittle resin is obtained.

The average number of hydrocarbon groups per silicon is important also. As the degree of substitution rises by incorporating disubstituted chlorosilanes in the starting monomers, the resultant resins become softer and more flexible.

The compatibility of silicone resins with organic resins depends on the type of hydrocarbon group on silicon. Silicones of high aryl substitution are most compatible with short oil alkyds and epoxy resins and incompatible with long oil alkyds. They are insoluble in aliphatic solvents. Just the reverse is true if a silicone resin contains a high proportion of an alkyl (e.g. ethyl or propyl) polysiloxane. Such resins are incompatible with short oil alkyds and epoxies, but compatible with long oil alkyds and soluble in aliphatic solvents.

The silicone resin of Figure 1 has two important properties—a low molecular weight, because of a high degree of cyclization, and approximately one hydroxyl group per three silicon atoms.

If a high proportion of the substituted groups are phenyl balanced by some alkyl groups, a formulation is obtained which is reactive with a variety of organic resins and economically feasible for study as a paint intermediate.

Such a reactive silicone resin, Dow Corning QZ-6018, was studied. This resin was used at 100% solids. As such it is a brittle, hard, clear resin melting 90-100°C. Its average molecular weight is 1600. At this molecular weight the average number of hydroxyl groups per molecule is four. Since these hydroxyl groups act as weak acids such a resin can be viewed as a highly functional polybasic acid. To some extent this functionality is reduced by a side reaction of intramolecular silanol-silanol condensation.

RESIN PREPARATION

Silicone-Alkyds

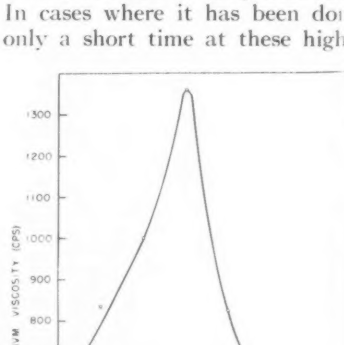
Two different methods were employed to prepare silicone-alkyd resins. A solvent cook was used with preformed alkyds. This method is preferred for modification of short and medium oil alkyds in order to give low acid numbers. A fusion cook, in which all the components of the alkyd and the silicone hydrolyzate were charged at once, was used to make the air-drying, long-oil alkyds. With long oil alkyds fusion cooks are preferred because of shorter reaction time.

Solvent Processing

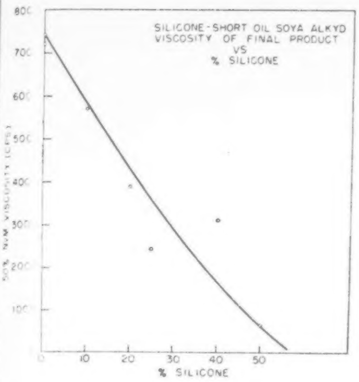
In the solvent process, the alkyd and silicone were charged to the usual alkyd laboratory equipment. The charge was diluted to 60% NVM with a suitable solvent, usually xylene, and heated with good agitation until the mixture became compatible. The compatibility was checked on a glass slide by heating a droplet at 200°C. until the solvent had evaporated. If the resin was compatible a clear film, free of haze was obtained. When the mixture was compatible, heating was continued to body the resin. An end point for the desired viscosity was a visual check of the cavity formed by the rotating agitator. When the cavity flattened and bubbles were retained in the resin mass, the heat was removed and the solution diluted to 50% NVM with xylene.

The solvent choice is important. Since the silicone is very soluble in xylene, any cook in xylene usually proceeds without difficulty. The reaction will take place in mineral spirits also, as the silicone is soluble in this solvent at reflux temperature. The temperatures at which these resins were processed were dependent on the solvent. If xylene was used, the temperature varied from 138-145°C; if naphthol mineral spirits was used, the temperatures varied from 155-160°C. Usually 4-8 hours was necessary to complete the resinification.

The processing was usually carried out at 60% NVM. At this dilution the reactants were concentrated enough to give a relatively fast reaction but slow enough to be controllable at the end point. Any reaction may be speeded up by concentrating the reaction mass to 70, 80 or even 90% NVM, but this is rarely necessary. In cases where it has been done, only a short time at these higher



Graph 1.



Graph 2.

concentrations was needed to start the reaction. The resin was then diluted to 60% NVM to complete the final bodying step.

The viscosity of the final product depended on the silicone content and the viscosity of the alkyd. With the higher silicone content, the viscosity decreased much more on dilution even though the same visual end point was used. (Graphs I & II.) This is probably related to the fact that the silicone portion of the resin gives a much lower viscosity, even when bodied, than most alkyds in the solvents used.

As was postulated earlier, the unreacted hydroxyl groups of the polyhydric alcohol react with the silanol groups of the silicone to give the desired compatibility of the two resins.

There is evidence that this reaction takes place.

1. Water is removed from the reaction.
2. The two components became compatible on cooking.
3. The viscosity increases at the point of compatibility.
4. The solubility characteristics of the resin mixture change.

The alkyds used were a short-oil coconut alkyd and a short-oil soya alkyd. The short-oil coconut alkyd silicones were tested as baking enamel vehicles and were heat aged. The silicone short-oil soya alkyds were evaluated as force-dry automotive finishes and as grey paints.

Fusion Processing

The fusion cooks have been limited to the air-drying long-oil type alkyd. They may be made by either a one-or two-stage procedure. In both procedures the silicone was added to the reaction with the dibasic acid. Phthalic anhydride was used in this work but other dibasic acids such as isophthalic, adipic, etc., could have been used with changes in formulation. (Tables, I and II).

Table I. Processing and Solution Properties of Silicone-Short Oil Coconut Alkyds*

	PROCESSING			SOLUTION		
Run No.	% Silicone	Cooking Temp. °C	Hrs.	% Volatility**	Visc. Cps.	Acid No. (NVM)
1	0	—	—	24.1	610	5.70
2	10	142	6.5	20.9	835	
3	20	141	7.0	19.0	1000	
4	30	138	5.25	15.1	1360	
5	40	142	5.75	12.3	824	
6	50	141	8.0	11.0	626	6.60
7	60	150	6.25	10.2	430	

Table II. Silicone Short Oil Soya Alkyds*

Run No.	% Silicone	Cooking Temp. °C	Hrs.	% Volatility**	Visc. Cps.	Acid No. (NVM)
8	0	—	—	16.4	7440	6.72
9	10	142	3.2	14.9	5700	6.14
10	20	140	4.2	15.3	3900	6.42
11	25	142	3.0	14.8	2410	7.20
12	30	138	3.3	11.9	3820	6.68
13	40	140	3.3	9.8	3120	8.04
14	50	138	3.0	10.5	617	10.06

* Cooked at 55% NVM in xylene and reduced to 50% NVM with xylene.
** 3 hours at 250°C

The one-stage cook consists of adding fatty acids, polyol, dibasic acid and silicone to typical alkyd laboratory equipment. A small amount of xylene was added to help remove the water and to keep the sides of the flask washed down. Heat was applied and when the mass became fluid enough to stir, agitation was started. The temperature of the resin mass was held at 230°-240°C for a period of about three hours. After the desired viscosity had been reached, the resin was diluted to 60% NVM with naphthol mineral spirits. The procedure was found to give shorter reaction times and higher final viscosities than a two-stage cook.

In a two-stage cook, catalyzed alcoholysis of the oil was carried out in the usual way. In the second stage, phthalic anhydride, silicone and a small amount of xylene were added to the alcoholyzed oil. The resin was then cooked to the desired viscosity at 230-240°C.

Pentaerythritol was used in all resins with a silicone content of 28% or less. At 37% silicone one half of the pentaerythritol had to be replaced with glycerine to obtain a low acid number before gelation. At 47% silicone it was necessary to use all glycerine.

These resins were infinitely mineral spirits soluble if the oil length of the final product was 45% or greater. Below 45% the resin was still mineral spirits soluble at 60% NVM but ultimate thinning was best carried out with higher KB solvents such as xylene.

This type of silicone-alkyd was used as a clear varnish and also evaluated in trime namels. (Table III).

Silicone-Epoxy Resins

The silicone-epoxy copolymers are an even newer field and little has been published about them to date. In two patents, issued to McLean, (39,40) a silicone-alkyd was cold blended with an epoxy resin. Millar et al (41) were issued a patent describing resinous materials from siloxy glyceryl phthalates and epoxy resins. Hatcher (42) made fatty acid esters of epichlorohydrin condensation products modified with silanols. Another patent recently issued (43) introduced a copolymerization of a silanol condensation product with epoxy resin in the presence of water and a catalyst.

The work covered in this paper is similar to the last mentioned patent except that it was not found necessary to use water in the co-condensation step.

Processing

The epoxy resin used in this

Table III. Composition and Solution Properties of Silicone Long-Oil Linseed Alkyds Made by Fusion Process*

Run No.	Moles Linseed Fatty Acids	Moles Phthalic Anhyd.	Moles Polyol	Silicone Gram	Silicone %	Visc. Cps.	Acid No. (NVM)
15	1.6	0.85	0.89PE[1]	0	0	1000	1.01
16	1.6	0.85	0.93' '	67	10	435	7.78
17	1.6	0.85	0.98' '	150	19	763	4.15
18	1.6	0.85	1.05' '	257	28	925	7.70
19	1.6	0.85	0.555' ' 0.759Gl[2]	400	37	725	5.35
20	1.6	0.85	1.676' '	600	47	360	5.43

1. PE — pentaerythritol
2. Gl — glycerol
* All resins diluted with naphthol mineral spirits to 60% NVM.

work was a condensation product of epichlorohydrin and bis-phenol A. Low and intermediate molecular weight resins of this type will react with silicones in a xylene solution. If the higher molecular weight epoxies of this type are used a more polar solvent, such as as high boiling ester, is required to dissolve the epoxy resin and the final product.

To process resins of this type, the epoxy resin, silicone and xylene sufficient to give a 60% NVM solution were charged to the usual laboratory equipment. A catalyst was also added. The catalysts most frequently used for this work were zinc octoate and 2-ethylhexoic acid. With the particular silicone used the reaction proceeds without catalyst. However, the reaction went more smoothly and the ultimate film properties were improved with the addition of a catalyst. The reaction mass was heated at reflux until the solution was compatible. This usually took from 4-10 hours. The resin was then cooked to the same visual end point used with silicone-alkyds and diluted to 50% NVM. A clear, sparkling solution was obtained when the final dilution was made with sufficient methyl isobutyl ketone to give a 75% xylene 25% MIBK solvent ratio.

A study of this reaction between other silicones and epoxy resins indicates that two other factors must be considered besides the solvent effect and catalytic action. To date, no silicones of the silanol type have been modified with epoxy resins where either the hydroxyl content was below 0.5% or the aryl content was below 40%.

These resins retain most of the epoxy groups during processing. It is felt that the hydroxyl groups along the epoxy resin chain are the reaction sites.

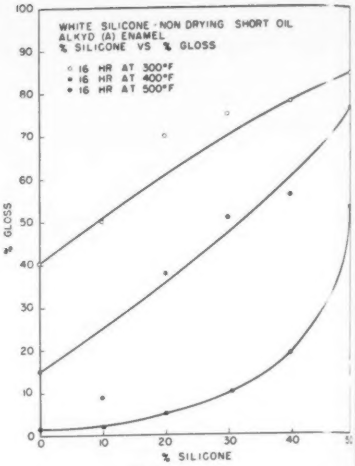
The resins can be cured at 150°C or at lower temperatures by use of the regular epoxy curing agents. For this work all of the films were heat cured. The resins were tested as laminating resins and as baking enamel vehicles. (Table IV).

RESIN EVALUATION

Silicone Alkyds

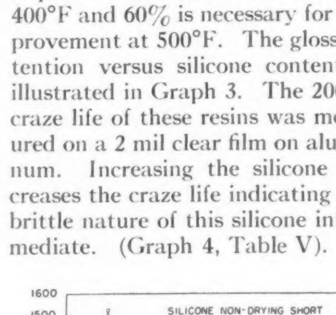
Short Oil Coconut

The film properties of this series of resins were tested by preparing a white paint using Titanox RA-10 at a P/B 60/100. A 1-mil film was cast on a steel panel and baked for 16 hours at 300, 400, and 500°F. Table V gives the test results on color, gloss, hardness, flexibility and impact resistance. Increasing the silicone content gives better color retention and gloss retention. Twenty percent silicone



Graph 3.

improves the color retention at 400°F and 60% is necessary for improvement at 500°F. The gloss retention versus silicone content is illustrated in Graph 3. The 200°C craze life of these resins was measured on a 2 mil clear film on aluminum. Increasing the silicone decreases the craze life indicating the brittle nature of this silicone intermediate. (Graph 4, Table V).



Graph 4.

Short Oil Soya

Film properties of the silicone short oil soya alkyds were tested by preparing a light blue automotive type enamel using Titanox RA-10 and phthalocyanine blue at a pigment to binder ratio of 15/35. The enamels were coated on steel panels over a primer and cured for 30 minutes at 275°F (Table VI). The panels were aged in an Atlas model XW Weather-Ometer. Graph 5 illustrates the improvement of gloss retention with increased silicone content. In this series also the craze life of the clear film decreased with the

Table IV. Processing and Solution Properties of Silicone-Epoxy Resins

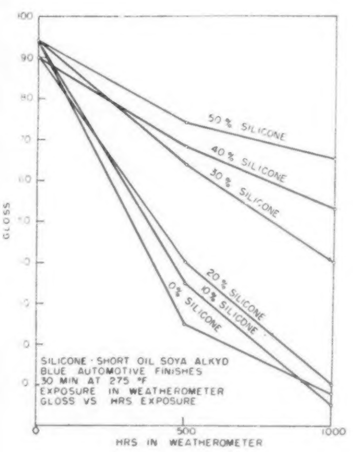
Run No.	Silicone	Cooking Temp.	Time to Compatibility	Total Time	% Wt. Loss	Visc. Cps.	Epoxy Equiv. (NVM)
21	0	——	——	——	10.3	64	520
22	25	162	5.5	20	11.2	214	835
23	50	142	3.3	7.5	7.7	224	1250
24	75	140	3.45	8.5	5.3	313	5000

All cooked at 60% solids in xylene, diluted with xylene-methyl isobutylketone sufficient to give final solvent 75 xylene/25 MIBK ratios at 50% NVM.

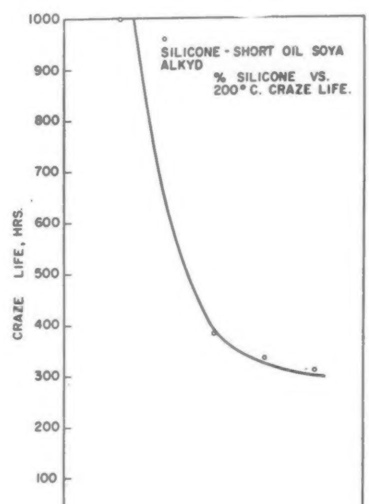
Resin No. (% Silicone)	Bake 16 hrs. at	Color	Gloss	Sward Hardness	1/2" Flex	% Adhesion	Impact 15"/#
1 (0)	300°F	7.5	44	8	P	100	6
	400	7.5	14	32	P	0	6
	500	5.5	14	36	F	20	2
2 (10)	300	10.0	66	20	P	100	8
	400	7.0	20	54	P	98	10
	500	5.5	3	40	F	86	2
3 (20)	300	10.0	63	22	P	100	4
	400	10.0	30	48	P	96	8
	500	6.0	3	42	F	65	2
4 (30)	300	10.0	77	27	P	100	6
	400	10.0	45	42	P	96	6
	500	6.0	13		F	70	2
5 (40)	300	10.0	77	26	P	100	6
	400	10.0	59	58	P	98	6
	500	6.0	27		F	70	2
6 (50)	300	10.0	86	46	P	100	6
	400	9.5	77	40	P	100	6
	500	8.0	61	42	F	—	4
7 (60)	300	10.0	82		P	100	10
	400	10.0	72		P	96	4
	500	9.0	55		F	90	2

Legend:
Color: 10 = white; 0 = brown
Gloss: Gardner 60° Glossmeter
Sward Hardness: Glass = 100
Adhesion: Crosshatch method
Impact: 10 = no failure; 0 = complete failure
Alkali Resistance: 10 = No effect; 0 = Film Dissolved

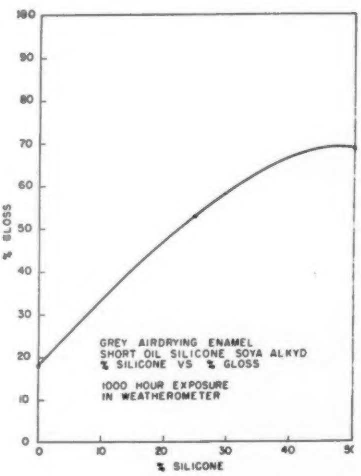
Table V. Silicone-Short Oil Coconut Alkyd Evaluation



Graph 5.



Graph 6.



Graph 7.

increase in silicone content (Graph 6).

Grey paints were made from a few of the silicone-short oil soya alkyds. The paints were air-dried and aged in the weatherometer. The gloss retention was again improved by increased silicone content (Graph 7, Table VI).

Long Oil Linseed

The film properties of this series were tested by catalyzing the resins with 0.06 Co., .03 Mn and .05 Ca (metals based on resin solids) and casting a clear film on steel panels. (Table VII)

The resins showed equivalent drying characteristics and hardnesses over the silicone content range. Poor alkali resistance at higher silicone content indicated

Table VI. Silicone-Short-Oil Soya Alkyd Evaluation

Table VI

Resin No. (% Silicone)	Film Thickness	Gloss	Sward Hardness	1/4" Flex	Impact 15"/#	% Adhesion
8 (0)	1.1	88	22	P	10	100
9 (10)	1.0	92	28	P	10	100
10 (20)	1.1	90	26	P	10	100
12 (30)	1.0	92	30	P	10	100
13 (40)	1.5	94	38	P	10	100
14 (50)	1.0	94	44	P	8	98

Legend:
Color: 10 = white; 0 = brown
Gloss: Gardner 60° Glossmeter
Sward Hardness: Glass = 100
Adhesion: Crosshatch Method
Impact: 10 = no failure; 0 = complete failure
Alkali Resistance: 10 = no effect; 0 = film dissolved

Table VII. Silicone-Long-Oil Linseed Alkyd Evaluation

Resin No. (% Silicone)	Drying Time* Hours	Sward Hardness 24 Hrs.	Sward Hardness 7 Days	Gloss **	Alkali Resistance 5 min. 2%	Alkali Resistance 30 min. 5%
15 (0)	8-16	16	28	89	8	6
16 (10)	8-16	10	22	85	8	3
17 (19)	8-16	18	32	87	10	6
18 (28)	8-16	18	32	90	8	0
19 (37)	8-16	14	28	93	8	0
20 (47)	8-16	8	22	80	10	0

* ASTM-D-115-52T
** Pigmented Film
Legend:
Color: 10 = white; 0 = brown
Gloss: Gardner 60° Glossmeter
Sward Hardness: Glass = 100
Adhesion: Crosshatch Method
Impact: 10 = no failure; 0 = complete failure
Alkali Resistance: 10 = no effect; 0 = film dissolved

Table VIII. Silicone-Epoxy Evaluation

Table VIII

Resin No. (% Silicone)	Bake 16 Hrs. at	Color	1/2" Flex	% Adhesion	Impact 15"/	200° Craze Life (Hrs.)
21 (0)	300°F	10.0	F	0	4	
	400	7.5	P	100	6	
	500	2.0	F	100	4	
22 (25)	300	10.0	F	20	2	1000
	400	9.0	F	100	2	
	500	4.0	F	80	0	
23 (50)	300	10.0	F	0	6	
	400	9.0	P	100	10	300
	500	5.5	F	100	6	
24 (75)	300	10.0	F	90	8	
	400	9.0	F	94	2	400
	500	6.0	F	80	0	

Legend:
Color: 10 = white; 0 = brown
Gloss: Gardner 60° Glossmeter
Sward Hardness: Glass = 100
Adhesion: Crosshatch Method
Impact: 10 = no failure; 0 = complete failure
Alkali Resistance: 10 = no effect; 0 = film dissolved

the lack of cure of the silicone portion of the resin at room temperature. Preliminary weatherometer data have shown that this type of resin exhibits the same good gloss retention as the short oil alkyd modifications. Chalking is decreased and the film does not wash away. Also, crazing and cracking are eliminated when these resins are pigmented for paints. Grey paints were prepared from these resins and showed equivalent initial gloss up through 40% silicone. This series of paints is being weathered on wood and metal in Florida.

Silicone-Epoxy Resins

These resins were tested as coatings and as laminating resins.

Coatings

These resins were evaluated as white baking enamels in the same manner as the silicone short oil coconut alkyds. Retention of gloss and color in heat aging is illustrated in Graphs 8, 9 and Table VIII).

Laminates

Laminates were made of this series of resins using heat-cleaned 181 glass cloth and 2pph phenylene diamine as catalyst. After a precure of 5 minutes at 110°C the laminates were press cured at 30 psi for 30 minutes at 175°C. The flexural strengths were measured on these laminates at room temperature and at 500°F as pressed and after heat aging.

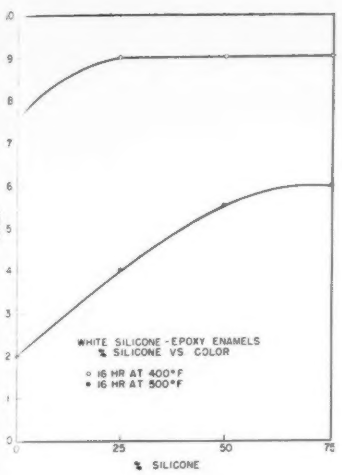
The 25 and 50% silicone resins give laminates with good room temperature strengths after a short afterbake and with fair retention of strength after aging at 500°F. (Table IX).

SUMMARY

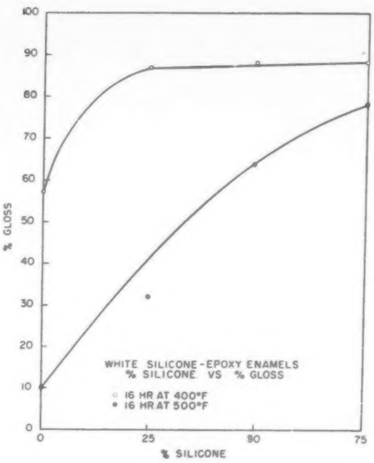
A study was made of the effect of silicone content on the processing and properties of silicone modified organic resins. A high phenyl content, reactive silicone resin of the siloxanol type was used as the source of silicone.

Silicone-organic resins were made by solvent and fusion processes. Commercial short-oil coconut and short-oil soya alkyds and epoxy resins were modified by a solvent process. Silicone-long oil linseed alkyds were made by a fusion process.

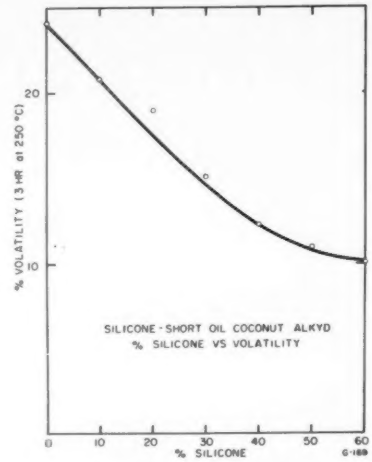
Enamels made with silicone-



Graph 8.



Graph 9.



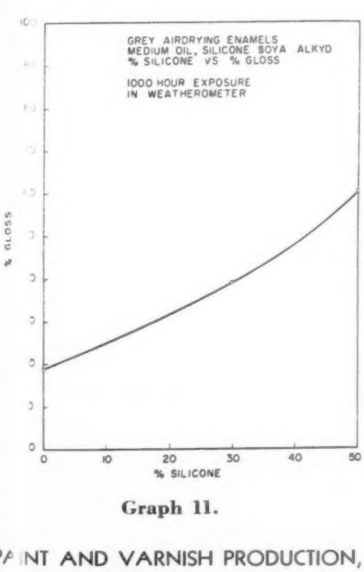
Graph 10.

Table IX. Silicone Epoxy Resins-Flexural Strengths of Laminates

Resin No.	No Afterbake		16 hrs/482°F		200 hrs/500°F		500 hrs/500°F	
(% Silicone)	Rm. Temp.	500°F	Rm. Temp.	500°F	Rm. Temp.	500°F	Rm. Temp.	500°F
21 (0)	74,900	6,090	69,100	5,360	Blistered & Delaminated		——	——
22 (25)	36,600	2,080	80,500	12,400	63,000	17,900	47,400	15,200
23 (50)	47,000	2,350	74,400	8,310	47,000	17,400	12,200	13,700
24 (75)	29,000	2,900	52,300	11,400	22,400	13,700	9,740	9,250
25*(0)	91,200	11,800	——	——	——	1,410	——	——

* Shell Epon 828 + 14.5 ppH phenylene diamine.

short-oil coconut alkyds and silicone-epoxies were heat aged. Increasing the silicone content improved the gloss retention and color retention. Force-dry enamels and air-dried paints from the silicone-short oil soya alkyds show increased gloss retention with increased silicone content on weatherometer aging. In all cases the craze life of clear silicone organic resin film decreased with increasing amounts of silicone.



Graph 11.

Laminates made with silicone epoxies on glass cloth had fair flexural strength after heat aging at 500°C.

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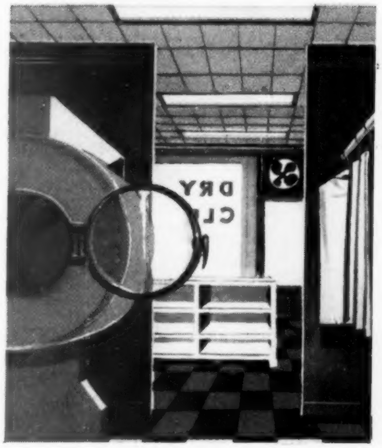
To formulate a lacquer resistant to dry-cleaning fluids



ANALYSIS: Because of the many chemical agents present in a dry-cleaning plant, this lacquer, first, must be capable of withstanding the attack of dry-cleaning solvents such as perchloroethylene and aliphatic hydrocarbons. Second, it must exhibit good moisture resistance. Third, it must have a satisfactory degree of hardness, flexibility, toughness and stability to ultraviolet light. And, last, for ease of formulation, the type of cellulose acetate butyrate selected must be compatible with a wide variety of plasticizers and other modifying agents.

SOLUTION: Of the four types of Eastman cellulose acetate butyrate used as film formers, those of lower butyryl content, EAB 171 (17%) and EAB 272 (27%), generally have better chemical resistance than do those of higher butyryl content, EAB 381 (38%) and EAB 500 (50%). Although EAB 171 has the maximum resistance to solvents, EAB 272 is resistant to solvents usually encountered in the dry-cleaning industry. This consideration focuses our choice between these two types, because, while EAB 381 and EAB 500 have greater moisture resistance than do EAB 171 and EAB 272, their advantage in this respect is not sufficient to be of importance here.

By selecting EAB 272, greater compatibility is obtained with a larger number of plasticizers and resins. This permits the lacquer formulator to select the modifying agents that will further improve the moisture resistance and other properties of films based on EAB 272, without compromising their chemical resistance.

In addition, EAB 272 is more soluble in common lacquer solvents than is EAB 171.

EAB 272, in common with all cellulose acetate butyrates, offers yet other advantages. In the lacquer maker's plant and in the final coating, the low flammability of cellulose acetate butyrate reduces fire hazards. Lacquers based on these esters exhibit outstanding color stability and resistance to weathering.

All Eastman cellulose acetate butyrates are available in at least two viscosity ranges. They are shipped as a fine dry powder in 50-pound multiwall paper bags. These esters dissolve readily to give clear, water-white solutions, are convenient to handle and are non-hazardous in storage. Advice on a specific formulation problem is available from your Eastman representative. We welcome your inquiry.

Authoritative, detailed information on the various types of cellulose acetate butyrate, including their chemical composition, physical properties and their use as film formers in metal lacquers, wood finishes, and textile and paper coatings is contained in Eastman's new 72-page booklet, "Cellulose Acetate Butyrate for Protective Coatings." It is a comprehensive, complete source file of fundamental information, reporting the results of years of work in formulating, testing and evaluating coatings based on cellulose acetate butyrate. Make sure a copy is always at hand by writing to the address below for yours.

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Flexbond 801	Copolymer					Essentially the same as FLEXBOND 800, but very slightly modified to impart adhesion to gloss alkyd surfaces. Exceptional resistance to discoloration on baking. For trade sale and industrial finishes.
Flexbond 811	Copolymer					A FLEXBOND 800 type polymer producing films with somewhat less flexibility but retaining all the other outstanding qualities.
Flexbond 855	Terpolymer					A very fine particle size emulsion having a Critical Pigment Volume Concentration of 60%. Its high pigment binding capacity commends it for use in formulating quality medium-priced paints.
Flexbond 306 (Formerly Exp. A-6)	Terpolymer					A new vinyl acetate-acrylic terpolymer exhibiting the color and sheen uniformity at high PVC's characteristic of 100% commercial acrylics.
Flexbond 100	Copolymer					A newly developed vinyl acetate-vinyl stearate copolymer emulsion. The evaluation of this material is particularly recommended in exterior paints. Forms highly flexible films without added plasticizer. Excellent water resistance.
Vinac WR-50	Homopolymer				[illegible]	A fine particle size homopolymer which forms films at room temperature and requires less plasticizer than most homopolymers to obtain equivalent flexibility. Recommended for fire retardant paints.

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Controlling Latex Quality with the ELECTRON MICROSCOPE

By
Vern W. Palen*

ORIGINALLY purchased for research purposes by Naugatuck Chemical Division, U. S. Rubber Company, a Norelco 100 KV electron microscope now performs other important jobs: It helps in the transfer of new latex manufacture from a laboratory scale to a pilot plant scale and from the pilot plant scale to plant production. Occasionally, it is also used to check routine production to determine if minor recipe adjustments are necessary

The Naugatuck, Connecticut plant is situated in a narrow valley about 23 miles north of Bridgeport. It began as a tiny sulfuric acid factory in 1904. Today the division produces more than 300 products in six cities scattered across the United States. In addition to acids, rubber chemicals and reclaimed rubber, Naugatuck Chemical is now a major supplier of plastics, agricultural chemicals, latex compounds and synthetic rubbers. Research and development have played an integral part in its remarkable growth.

During the past 25 years, sales volume has increased 800% and much of this progress is credited to modern methods and instrumentation. In addition to the electron microscope, Naugatuck has many other powerful analytical tools, such as a Perkin-Elmer Vapor Fractometer, a double-beam infrared spectrophotometer and several ultraviolet spectrophotometers.

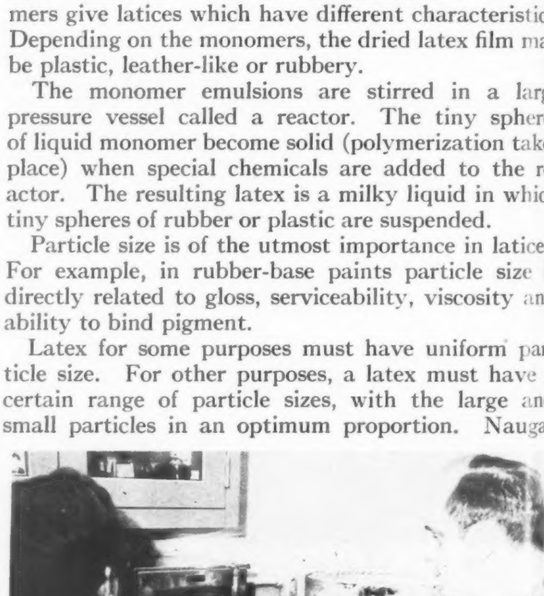
The Connecticut plant employs about 2,000 workers. A major part of production consists of synthetic rubber for special purposes. Such materials, in the form of latex, are used by other manufacturers in compounding rubber-base paints, coatings for paper and rubber backing for rugs. Latex is also used to make such things as toys, balloons and rubber gloves.

In its manufacture, latex starts as an emulsion of monomers mixed with water and detergents. Monomers may be either liquids or gases, such as styrene and butadiene. Different combinations of monomers give latices which have different characteristics. Depending on the monomers, the dried latex film may be plastic, leather-like or rubbery.

The monomer emulsions are stirred in a large pressure vessel called a reactor. The tiny spheres of liquid monomer become solid (polymerization takes place) when special chemicals are added to the reactor. The resulting latex is a milky liquid in which tiny spheres of rubber or plastic are suspended.

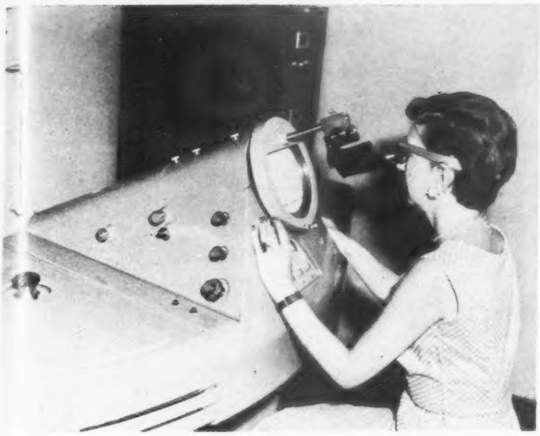
Particle size is of the utmost importance in latices. For example, in rubber-base paints particle size is directly related to gloss, serviceability, viscosity and ability to bind pigment.

Latex for some purposes must have uniform particle size. For other purposes, a latex must have a certain range of particle sizes, with the large and small particles in an optimum proportion. Nauga-



The particle-size problem is discussed in the electron microscope laboratory at the Naugatuck Chemical plant in Connecticut.

*Philips Electronics, Inc.



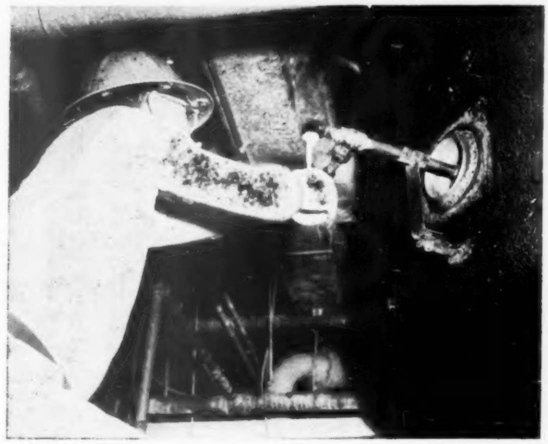
The image on the electron microscope is adjusted prior to the recording of latex particle size and distribution on film in camera.

tuck Chemical uses the electron microscope as the only satisfactory way of accurately relating the particle size to the end use of the product.

At Naugatuck Chemical, samples are drawn from the reactors in the laboratory pilot plant or plant and are sent to the laboratory for examination in the electron microscope. Specimens are prepared by diluting the samples. The resulting solutions, for example, usually consist of ¼, ½ or 1 drop of latex in about 50 cubic centimeters of water.

The specimen grid for the electron microscope, on which a very thin plastic film has previously been deposited, now receives a small amount of the diluted latex. It is applied either by spraying, or by allowing a small drop of the latex to dry on the grid. In the case of butadiene polymers, the drop of latex is exposed to bromine vapor to harden the latex spheres which would otherwise collapse on drying. Naugatuck Chemical prefers the spray method for sample preparation. When a drop of latex is used on the grid, the large particles tend to go to the center of the drop as it dries, with the small ones staying around the edges. The electron micrographs may not give the right conclusions on the proportions of large and small particles. By applying the latex as a spray, the atomized droplet puts the particles in a vary small area on the grid. All the latex particles in the droplet can be seen in one field.

Specimen solutions being prepared by mixture of one drop or less of latex with 50 cubic centimeters of water.



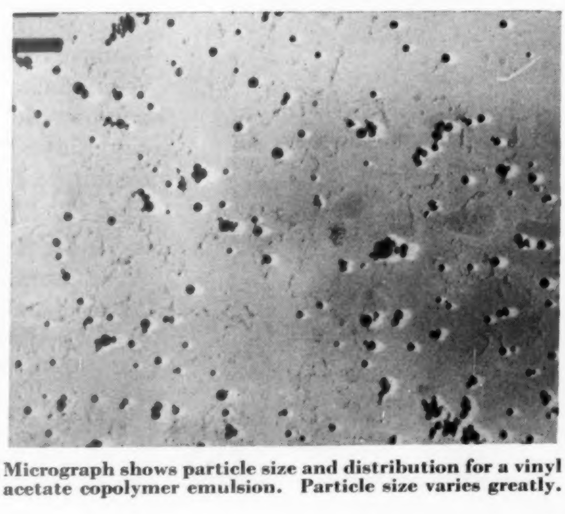
A sample of latex is drawn from large reactor at Naugatuck Chemical plant. Sample will be sent to electron microscope laboratory for examination.

In working with unknown polymers, there is always the possibility that the latex spheres will shrink while under examination in the microscope. To guard against this, the specimen is shadowed with palladium. If shrinkage occurs, the latex sphere will be smaller than its shadow on the micrograph, and the shadow is then used for the measurements.

Specimens are inserted in the electron microscope and the instrument is adjusted to produce images on the screen of 4000 X and 20,000 X magnifications. The microscope camera then records the pictures on the film. Photographic enlargements provide micrographs having magnifications 2½ times that on the screen, i.e., 10,000 X and 50,000 X. Occasionally higher magnifications are taken, the overall limit being about 300,000 X.

To assure accuracy of magnification, a grating of 30,000 lines per inch is used for reference. The grating is photographed at the beginning and end of each roll of film. This permits accurate comparison with the 30 or more latex micrographs recorded on the same

(Turn to page 74)



Micrograph shows particle size and distribution for a vinyl acetate copolymer emulsion. Particle size varies greatly.

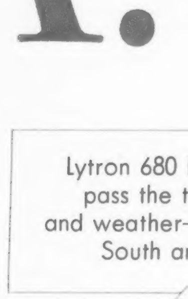
Q. *Will* LYTRON 680

the panel says:

A. *Yes . . .*

Superiority of Lytron 680 based paints proved in 2-yea panel tests in Florida, Massachusetts and California

unpainted and previously painted panels—asbestos shingle, cement, mortar joints, oil-primed wood, weathered oil painted wood (all fac at 45° south). Excellent results, in a wide variety of pigment volum concentrations (from 30% to 50%), and in a number of different colo



Monsanto's major objective in the development of Lytron 680 was to produce a flexible, non-oxidizing polymer with maximum pigment binding power, stability, low coalescence temperature and early water resistance, at a cost which would permit the use of the latex in either exterior or interior paints.

How does Lytron 680 measure up? A chemically unique acrylic-type polymer latex, Lytron 680 synthesis of monomers well b to form a smooth flexible fi at temperatures below 40° F. w out modification. Films ca Lytron 680 are water resis 30 minutes, do not rupture on rous substrate. No color mot spotting. Minimum blisteri over green masonry. Co small particle size assures binding of high volumes of p

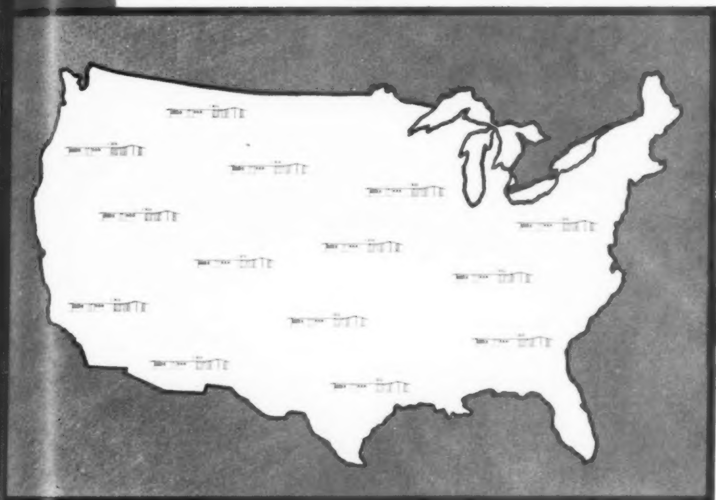
Y also t on used cedar c and unp made i fession

YES . a paint f cone able m

to fo ion, to su ific bind 680 equa s, m vehi pain with ede

Easy-to-apply
Lytron 680 based paints
can slice exterior painting
time almost in half!

help you produce superior latex paints?



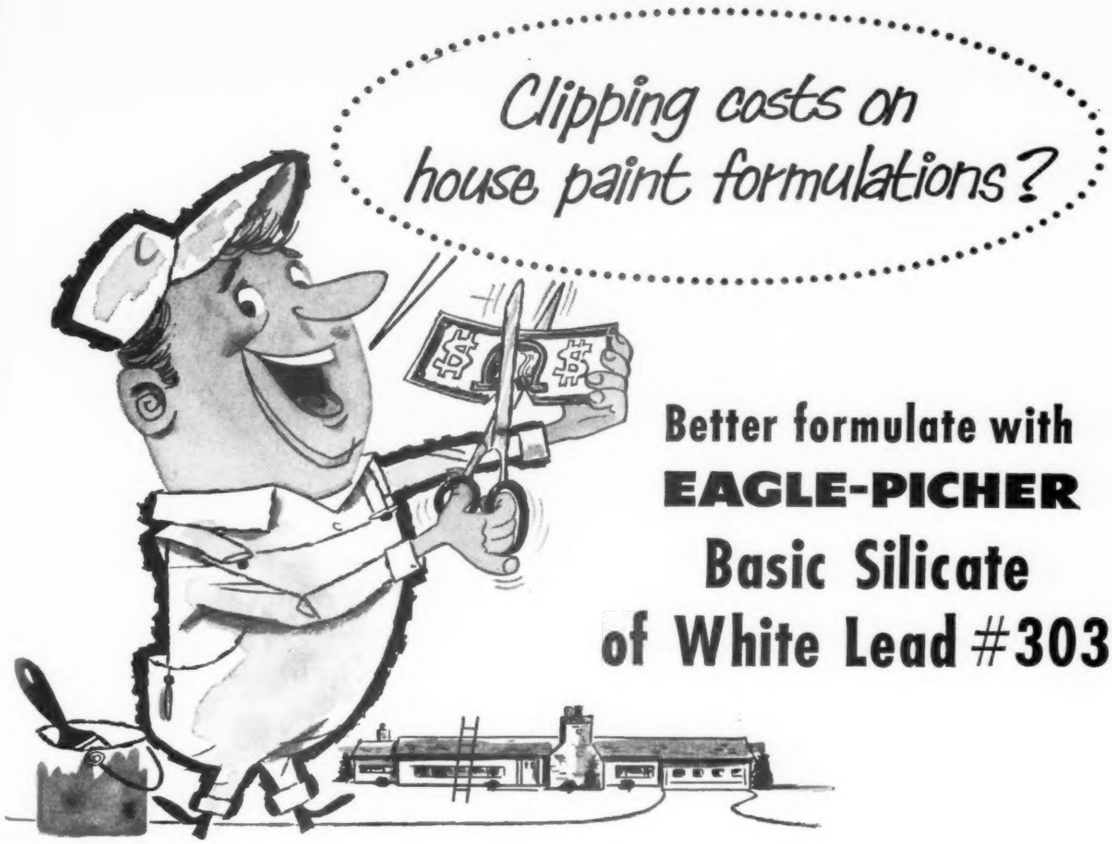
Early moisture resistance
insures against
the "3 R's":
Rain, Ruin and Repainting!

Yes! **Exterior paints made with Lytron 680 also tested on homes in 14 climatic areas for 2 years** on used brick, cement shingles, wooden sash, chalking stucco, blistering cedar clapboard, cedar shingles, pine clapboard, cement block, painted and unpainted brick. Results: Excellent, everywhere! (Paints used were made in commercial plants in production size batches, applied by professional painters and home owners.)

YES . . . *with Lytron 680, you can economically produce and sell a paint your customers can use more easily under a wider variety of conditions than is now possible with any other currently available material!*

Low temperature
coalescence of Lytron 680
based paints s-t-r-e-t-c-h
the painting season!

to form films with excellent adhesion, color retention and resistance to substrate alkalinity without sacrificing stability. Developed as a binder for exterior paints, Lytron 680 incorporates features making it equally useful as a sole vehicle or as a modifier for other alkaline latex vehicles in high quality interior paints. Paints are being formulated with Lytron 680 with standard procedures and equipment.



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Improved

TALL OIL FATTY ACIDS

By

C. S. Nevin
C. R. Young

A chemical process has been developed for treating distilled tall oil fatty acids which reduces the color to a Gardner value of 1-2 and improves considerably the drying characteristics.

The process consists of reacting tall oil fatty acids with 0.3% zinc dust at 235°C. for 30-40 minutes under an atmosphere of nitrogen. The unreacted zinc is removed, and the treated fatty acids are vacuum distilled. A yield of 97% product and 3% residue is obtained.

The product has good color stability, and analyses show that the gross chemical composition of the fatty acids mixture is essentially unchanged. Alkyd resins made from the product have drying characteristics superior to alkyds made from untreated tall oil fatty acids and equivalent to alkyds made from more expensive rapid-drying commercially available distilled fatty acids.

TALL oil is made from a by-product (black liquor soap) obtained in the manufacture of kraft paper from pine wood by the sulfate process. The crude material is a dark brown, viscous oil consisting mainly of about 35-55% by weight of rosin acids related to abietic acid, and about 60-40% by weight of fatty acids, mostly oleic and linoleic acids. The remaining 5-10% is a mixture of unsaponifiables and materials of incompletely established chemical identity. This crude tall oil is ideal for applications where rosin acids and fatty acids can be used together, and where dark colors are unimportant. Thus, large quantities are used in the paint, varnish, and linoleum industries because of their excellent drying properties.

A variety of refined and fractionated products from crude tall oil are commercially available. One of the most highly fractionated products is distilled tall oil fatty acids. This material consists of about 1-12% of rosin acids, 83-98% of fatty acids, and 1-5% of unsaponifiables and other unidentified materials. It is lighter colored than the less refined products and has a relatively good odor, but it does not possess the fast drying properties of the cruder products. This is due partially to its lowered rosin acid content, and partially to the presence of unknown interfering constituents (or natural antioxidants) which inhibit rapid drying.

A large variety of techniques and processes have been investigated in attempts to remove from tall oil fatty acids both the color producing compounds and the interfering constituents responsible for the poor drying qualities. Such prior attempts, as for example, further fractional distillation (5), (8), selected solvent extractions (3), (7), low temperature crystallization (4), liquid thermal diffusion (6), or urea complex separations (2), have been either uneconomical or commercially unfeasible.

A laboratory observation suggested the possibility of converting the color producing compounds under reducing and polymerization conditions to substances either colorless or not volatile at the boiling range of the tall oil fatty acids. Therefore, the reactions of tall oil fatty acids with a variety of reducing and polymerization reagents, such as zinc chloride, zinc hydrosulfite, substituted catechols, sulfonic acids, activated clays, sodium alcoholates, and nickel hydrogenation catalysts were investigated. Although some effect was noted with several of these reagents, best results were obtained by heating the fatty acids with a combination of zinc and acetic acid, followed by distillation under reduced pressure. This produced a material with noticeably improved color which, furthermore, showed improved drying properties when made into "long oil" alkyd resins. Development of this zinc treatment led to the following process for the improvement of tall oil fatty acids.

Zinc Process

A sample of distilled tall oil fatty acids is heated under an atmosphere of nitrogen to 235°C. Based on the weight of the fatty acids, 0.3% zinc dust is added, and the mixture is stirred for 30-40 minutes while maintaining the temperature at 235°C. Dur-

Mr. Nevin is associated with the Research Division, A. E. Staley Manufacturing Co., Decatur, Ill. and Mr. C. R. Young with the American Cyanamid Co., Stamford, Conn.

This paper was presented before the Naval Stores Symposium of 131st Meeting of the American Chemical Society, Division of Paint, Plastics and Printing Ink Chemistry.

ing the reaction some of the zinc dust particles agglomerate, while others are converted to zinc salts with the simultaneous release of nascent hydrogen. By discontinuing the stirring, the agglomerated zinc immediately settles and is readily separated from the fatty acids. The fatty acids are then distilled at 220-230°C. and 10-15 mm pressure. A yield of 97% product with a 3% residue consisting mainly of zinc fatty acid salts is obtained.

Evaluation Data

Table I presents some analyses of specific tall oil fatty acid samples before and after the process treatment. It is evident that the gross chemical composition is essentially unchanged by the treatment.

To determine the effect of the zinc treatment on the drying properties of the tall oil fatty acids, alkyd resin clears and air-drying, alkyd resin white enamels were prepared from the treated and the untreated tall oil fatty acids. For further comparison, similar alkyd clears and enamels were prepared from a commercially available, rapid-drying, expensive, distilled fatty acid mixture. Its approximate composition was 54% linoleic acid, 40% oleic acid, 2% linolenic acid and 4% saturated acids.

A summary of the drying rate evaluations for a few specific examples of both the alkyd resin clears and the alkyd resin enamels is presented in Tables II and III. Under test conditions in an air-conditioned room at 77°F. (± 2°F.) and 50% (± 4%) relative humidity, (1) "Dust free" indicates that a finger may be drawn lightly over the film without leaving a mark, (2) "Set to handle" indicates that finger marks produced by light pressure may be removed by gently polishing, (3) "Light tack" indicates a slight tacky feeling as obtained by a 50 gram weight-5 second Tack Test result, and (4) "Tack free" indicates the complete absence of tack as obtained by a 300 gram weight-5 second Tack Test (1) result.

(*Turn to page 74*)

Sample	Gardner Color Units	Acid Number	Rosin Acids %	Unsaponi-fiables %	Conjugated Linoleic Acids %	Total Linoleic Acids %
A-(untreated)	6+	194	1.4	2.4	4.7	44.6
A-(zinc treated)	1+	195	1.1	2.4	4.7	44.5
B-(untreated)	10	188	4.0	3.7	6.5	39.6
B-(zinc treated)	3	192	3.3	3.5	6.1	39.8
C; D; E-(untreated)	6+	194	1.2	2.4	5.0	42.5
C-(zinc treated)	1+	195	1.0	2.5	5.1	40.7
D-(zinc treated)	1+	195	0.9	2.4	4.5	43.3
E-(zinc treated)	1+	195	1.0	2.5	4.6	41.2

Table I. Analyses of Tall Oil Fatty Acids Before and After Zinc Process Treatment

	Hours to Reach Film* Description			
Fatty Acid Used	Dust Free	Set to Handle	Light Tack	Tack Free
Tall oil sample A (untreated)	4	6	8	24
Tall oil sample A (zinc treated)	2.5	3	4	8
Rapid-drying commercial sample	2.5	3	3.5	7
Tall oil sample B (untreated)	5.5	16	>16	<24
Tall Oil sample B (zinc treated)	3.5	5	5.5	9
Rapid-drying commercial sample	2.5	4	4.5	7

*0.0015 inch wet films on glass

Table II. Drying Rate Evaluations for Fatty Acid Alkyd Clears

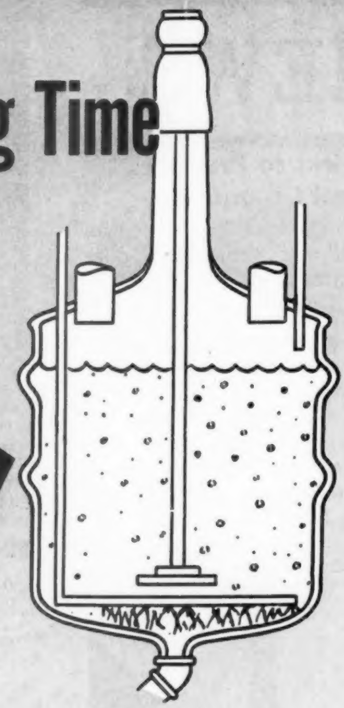
	Hours to Reach Film* Description			
Fatty Acid Used	Dust Free	Set to Handle	Light Tack	Tack Free
Tall oil sample C (untreated)	4	6	7	>16
Tall oil sample C (zinc treated)	2	2.5	3.5	6
Tall oil sample D (untreated)	4	6	7.5	<24
Tall oil sample D (zinc treated)	2	3	3.5	7
Rapid-drying commercial sample	1.5	2.5	3	6

*0.0015 inch wet films on glass

Table III. Drying Rate Evaluations for Fatty Acid Alkyd Enamels

CO_2 Sparging Cuts Cooking Time by 485 Minutes

PERFECT RESULTS in 1/3 the time



Actual tests conducted in the laboratories of a major manufacturer (name on request) produced these conclusive findings:

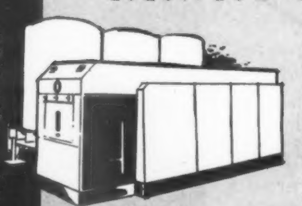
CO_2 sparging, added to conventional mechanical agitation, cuts cooking time from 720 to 235 minutes! To achieve this remarkable saving, CO_2 functioned in 3 important ways—

1. Sparged up through the mixture, CO_2 markedly increased agitation, causing faster, more even cooking.
2. Passing up through the mixture, the CO_2 bubbles absorbed water vapor from the product—allowing the mixture to reach the desired cooking temperature sooner.
3. CO_2, when sparged through the reaction mixture, inerts it—effectively inhibits oxidation—color stays desirably light and constant.

Here are some of the many ways in which CO_2 is helping to do a better job and lower costs.

- Cuts oil cooking time 2/3
- Retards oxidation in thinning tanks and provides fireproof blanket
- Prevents "skinning" in storage
- Safest transfer medium for flammable fluids
- Purges filters, recovers oil, reduces cleaning time and frequency of cleanings
- Prevents flash fires, explosions—CO_2 provides a heavier-than-air "blanket" that displaces oxygen
- Prevents "skinning" and eliminates costly cleanouts of transport containers

LIQUIFLOW CO_2 SYSTEM



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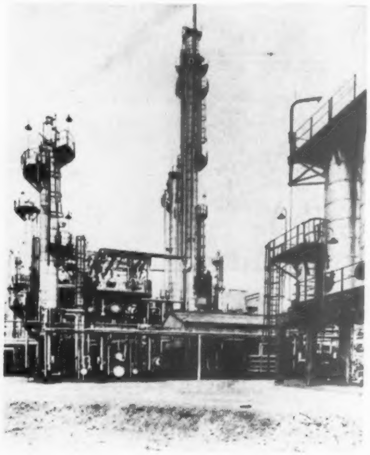
NEWS

J & L First to Produce Pure Coal Chemicals

Jones & Laughlin Steel Corp. has claimed first production of pure coal chemicals in the steel industry.

A new plant at the company's Aliquippa (Pa.) Works has begun production of high grade benzene, toluene and xylene. A light oil containing the chemicals is produced from the coking of coal to make metallurgical coke for the company's blast furnaces.



Jones & Laughlin Steel Corp.'s new coal chemicals purification plant at the Aliquippa (Pa.) Works.

The plant has a rated capacity of 55,000 gallons per day of light oil. The Hydrofining and Udex processes which have been adapted to coal chemical purification have been combined at the new plant at a cost of more than $2 million.

The Hydrofining unit, which removes sulfur compounds and promotes other desirable chemical reactions, is licensed from Esso Research and Engineering Co. The Udex process, which removes the aromatic hydrocarbons from the light oil, is licensed from Universal Oil Products Co.

A major feature of the company's new refining process is the ability to separate the benzene, toluene and xylene as high-purity products without making intermediate materials.

DEDICATE LABORATORY: Mrs. C. Frederick Rau, treasurer of McCloskey Varnish Co., acknowledges presentation of a memorial plaque during dedication of the firm's new laboratory building in Los Angeles. The laboratory is dedicated to the late C. Frederick Rau, M.D., founder of McCloskey Varnish Co. of the West. McCloskey representatives are, left to right: G. W. Jolley, F. C. Peck, A. U. Hershey, H. W. Hecht and G. H. Gough, Jr.

Manual to Aid Architects

A paint specifications manual designed to aid the architect in selection and specification of proper finishes for almost any type of surface condition has been announced by The Glidden Co.

The 28-page manual relates architects' needs as they apply to paint and painting problems. It features a comprehensive selection chart which presents descriptions of various painting systems and matches them with materials, surfaces and types of finishes.

Also included is a section on evaluation of painting systems which offers architects a view of the vast strides made in recent years in paint research, particularly in the field of liquids and resins.

Another section includes methods of application, drying times, calculated coverages and types of thinners to be used for paint products used in suggested specifications.

The manual is to appear in the 1958 edition of Sweet's Architectural File.

MINIMUM FILM-FORMING TEMPERATURE TESTER: Paint chemists examine apparatus developed at Rohm & Haas Co.'s Bridesburg coatings laboratories for study of minimum film-forming temperatures of emulsions, emulsion paints and other coatings. Dr. George L. Brown, research supervisor (short sleeves), shows four strips of acrylic latex paint film under study in apparatus developed under his supervision.

Apparatus maintains temperature gradient of many degrees along paint strips from frost-covered zone in test bed at right to hot zone at left. Two-handled Plexiglas cover at left is placed over test bed for controlled humidity tests. Black box contains automatic temperature and humidity recorders.

NEWS

Daniel R. Conlon (left), head of Instruments for Industry and Research, and Lemmuel Hill, production supervisor, examine "Therm-O-Watch" unit, which converts thermometer into thermoregulator for controlling other apparatus.

To Build Development Center

A new development center is to be constructed for the paint and brush division of Pittsburgh Plate Glass Co. at Springdale, Pa., where the division operates a paint and plastics plant and a research center.

The company announced that estimated completion date is September, 1958. Construction of the two-story structure, which is to contain more than 15,000 square feet of floor space, is to begin immediately.

According to C. R. Fay, vice president of the paint and brush division, the new facility is to be used as an intermediate step in moving newly-developed products from the test tube stage to full-scale factory production.

The development center will also work on more simplified methods of pigment wetting and dispersion, continuous paint manufacturing techniques and more accurate measuring and compounding of ingredients.

The development center is to be operated independently of the manufacturing and research operations at Springdale. It will be under the supervision of Paul R. Croll, general manager of technology for the paint and brush division.

Instrument Firm Offers Laboratory Automation

Low-cost automation of routine procedures used in scientific research is being provided by a Philadelphia firm called Instruments for Industry and Research.

The firm is headed by Daniel R. Conlon, consulting engineer in instrumentation and former research automation specialist for Rohm & Haas Co.

The firm has established research and production facilities in a 2,000-square foot laboratory, where three types of automated instruments are now in production, and prototypes of other mechanized equipment are being tested.

According to Mr. Conlon, more than 200 of the "robot chemists" are being employed in laboratories. The firm employs the tradename, "I^2R," which is the engineer's symbol for power.

Instruments produced by the company are small, low-cost, light weight electronic units designed to watch time, pressure, temperature, foam level, liquid level and other variables. The instruments automatically turn on and off other devices as they watch. Auxiliary devices sense potential failures in associated equipment.

A typical instrument now in production is called "Therm-O-Watch." The unit has a small electronic "brain," which clips on to a mercury thermometer or manometer and converts the instrument into a temperature or pressure regulator.

Mr. Conlon is a graduate of Union College. He spent ten years with Atlantic Refining Co. developing instruments for the production and refining of petroleum, and 12 years with Rohm & Haas, doing instrument research and development.

RECEIVES PAINT AWARD: Robert W. Matlack (left), George D. Wetherill & Co. Inc., receives the George Baugh Heckel Paint Industry Magazine Award in a ceremony during last month's meeting of the Philadelphia Paint and Varnish Production Club. Presenting the award is G. H. Wescott of the Award Committee. Also present are Robert Toothill, vice president of the Philadelphia Club, and L. P. Spencer, treasurer.

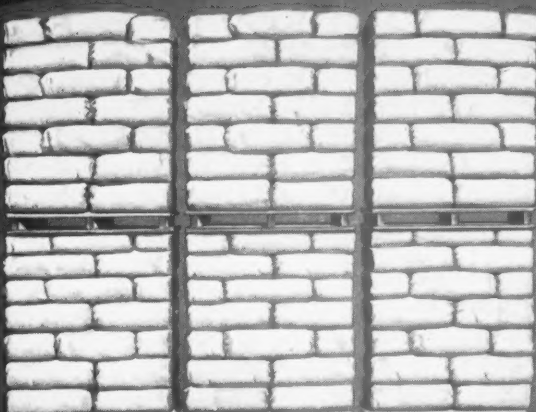
Albert A. Nemzek Dies

Albert A. Nemzek, technical director of W & M Products Corp. of East Detroit, Mich., passed away suddenly at his home last month. He was 58 years old.

Mr. Nemzek had formerly been employed as technical director of Inter-Coastal Paint Co. of Baltimore, Md.

AZODOX

New, Higher Density Zinc Oxide



STORES IN HALF THE SPACE

HERE ARE OTHER IMPORTANT REASONS WHY AZODOX IS BEST FOR YOU

Increased Mixing Capacity. AZODOX incorporates readily in oil, disperses completely. Its high density, low bulk gives greater capacity, steps up production in both mixers and mills.

Physical Properties Unchanged Except for Density. Consistency, particle size and shape, color and all other physical properties of AZO-ZZZ, American Process, paint grade zinc oxides are unaltered. *Apparent density only is changed.* All chemical properties are unchanged.

Flows More Freely, Less Dusting than conventional zinc oxides.

AZODOX Cuts Your Costs. Faster handling, easier storing, quicker mixing save you money.

Samples and test-lots of factory-proved AZODOX now available for you *at the same price of conventional zinc oxides.*

AZODOX is a revolutionary new form of zinc oxide (de-aerated). With twice the density, half the bulk of conventional oxides, AZODOX is the answer to your storage problem. AZODOX comes to you in an easy-to-handle small package, shaped to permit closely packed, unitized shipments. *And the perfect texture of the material remains unchanged.*

AZODOX is available in all grades of American process lead-free zinc oxide.

American Zinc sales company

Distributors for

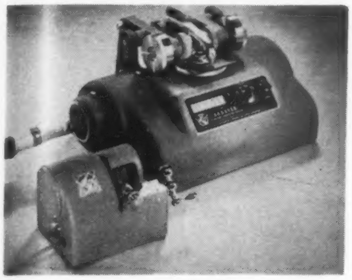
AMERICAN ZINC, LEAD & SMELTING COMPANY

COLUMBUS, OHIO • CHICAGO • ST. LOUIS • NEW YORK

NEW MATERIALS & EQUIPMENT

A MONTHLY MARKET SURVEY

This section is intended to keep our readers informed of new materials and equipment. While every effort is made to include only reputable products, their presence here does not constitute an official endorsement.



TABER

ABRASION TESTER
With Improvements

The 1958 Model Taber Abrasion Testing Set consists of laboratory abraser and wheel refacer (115 volts, 50 or 60 cy.) plus accessories and supplies.

The improved Model 174 Abraser incorporates a built-in motor with worm reduction drive for uniform high torque, automatic "stop" electric counter and new selector circuit, which insures that each abrasion cycle is counted exactly.

Motor-driven fan forces cooling air around motor and through interior of aluminum housing. Model 200 Wheel Refacer said to precision dress abrading wheels of abraser. Wheel refacer incorporates capacitor-type heavy duty motor, sealed bearings and oversized motor shaft in aluminum housing.

Taber Instrument Corp., Dept. PVP, Section 233, N. Tonawanda, New York.

EMULSIFIER
Water in Oil Type

Water-in-oil emulsifier able to form unusual thermostable emulsions has been announced.

Product has had wide use in Europe, where it has been developed. Called Emocithin, it is a semisolid containing neither inorganic nor toxic substances, and is easily incorporated into oils, fats and waxes by simple warming and blending techniques.

Ability to form fine dispersions said to make Emocithin ideal for dispersing pigments. Counteracts pigment settling. Product produces emulsions which are said not to separate at temperatures up to 200°F. Emulsions said to be pure, tasteless and odorless.

Morningstar, Nicol, Inc., Dept. PVP, 630 W. 51st St., New York, N.Y.

READ STANDARD

SPLIT-LEVEL MIXER
Greater Mixing Area

Now available is split-level mixer designed to handle high density, high viscosity chemical ingredients.

Mixer said to have 50 per cent additional effective mixing and heat transfer area. Available in 150, 350, 750 and 900-gallon sizes.

Also available is continuous double arm mixer, built to provide homogeneous mixes of most materials, including those of high density or high viscosity.

Read Standard Division, Capitol Products Corp., Dept. PVP, York, Pa.

FURNACE
For Heating Micro Samples

Micro Combustion Furnace operates over temperature range of 150 to 1130°C. Single unit can be used in determination of carbon, hydrogen, nitrogen, sulfur, fluorides and oxygen.

Heating element, of one-piece Nichrome V wire, is special helix-wound coil designed to eliminate hot center and cold ends. Manufacturer says there is virtually no temperature variation along entire length of tube.

Furnace can be heated to 1125°C. in less than ten minutes, and cooled to room temperature in about same time, according to manufacturer. Thermocouple indicates temperature within combustion tube. All common combustion tubes up to 12mm in diameter are accommodated.

Furnace dimensions are 14 inches long, 9¼ inches wide and 6½ inches high. Casing adjustable from 9¼ to 10¾ inches for easy positioning of unit in a combustion train.

Fisher Scientific Co., Dept. PVP, 384 Fisher Bldg., Pittsburgh 19, Pa.

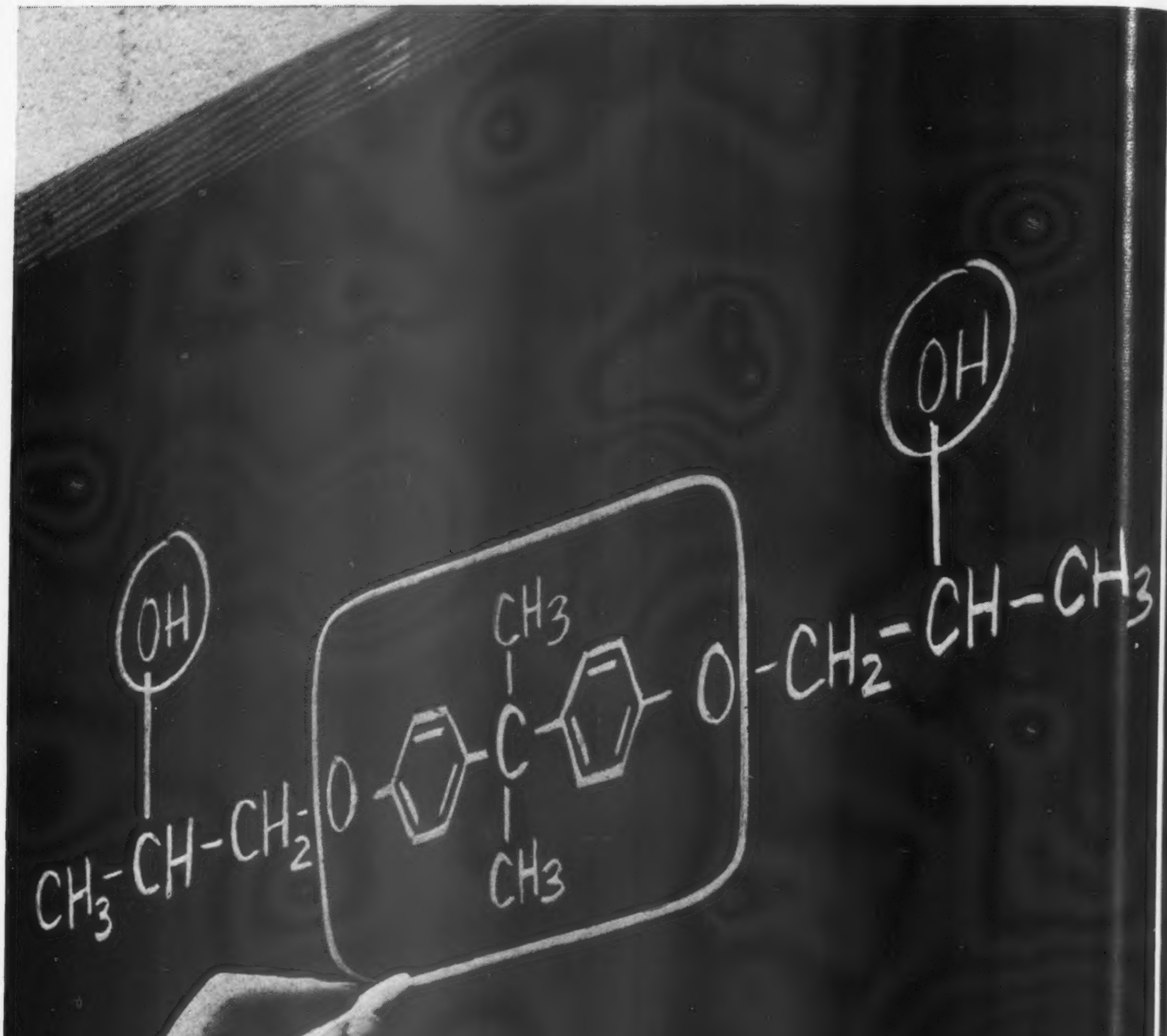
FISHER

BRONZE POWDERS
In Four Shades

Four shades of bronze powders are available for incorporation into metal spraying compounds.

Three shades are for regular paint formulas, the fourth is for anti-fouling paint. Additional shades for picture frame and moulding paints are also included in the line. Colors vary from pale gold to deep copper.

Hummel Chemical Co., Inc., Dept. PVP, 90 West St., New York 6, N. Y.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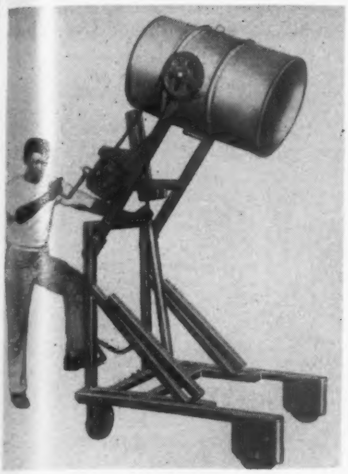
NEW
MATERIALS — EQUIPMENT



STERLING FLEISCHMAN

HYDRAULIC DRUM LIFT
For Controlled Pouring

Hydraulic drum lift equipped with mechanical arrangement for ease and safety in pouring drum contents is now being marketed.

Gear reducer control device is completely enclosed and said to assure self-locking and absolute control at any pouring angle. Said to be especially advantageous where contents of half-empty drums must be carefully poured.

Unit basically designed to handle 55-gallon drums, can be adapted to handle other sizes in steel or fibre drums on special order. Lifting capacity is 750 pounds, drums can be raised to 70 inches by foot-actuated hydraulic jack.

Unit is constructed of square steel tube, mounted on six-inch oil, gas and spark-proof wheels. Length is 49″, height is 56½″ and width is 38″.

Sterling Fleischman Co., Dept. PVP, P.O. Box 94, Broomall 1, Pa.

BENZOGUANAMINE
Resin Intermediate

Benzoguanamine, an organic chemical said to be adaptable to a wide variety of uses in the paint industry is now commercially available.

The chemical is a member of the triazine family, and is similar in many respects to melamine. Chem-

ical is produced in form of free-flowing white crystals, and has mild organic odor. Relatively non-toxic, according to manufacturer.

Benzoguanamine reacts with formaldehyde and alcohol to form triazine resin, and may be processed with same equipment and techniques used for melamine.

Tennessee Products and Chemical Corp., Dept. PVP, 326 Union St., Nashville, Tenn.

SEMI-AUTOMATIC BALANCE
Rough and Fine Weighing Beams

A one-pan analytical balance for weighings from 0.1 milligram to 200 grams has been announced.

Balance features "Two-Beam Construction." All weighings from one to 200 grams are made to within one gram on a "rough-weighing" beam. Operator does not have to watch reticle during rough weighing. Amber lights at eye level indicate which way weight control knob should be turned to adjust within one gram.

Weighing adjustments from 1/10 milligram to one gram are made on "fine-weighing" beam completely automatically. Two-Beam Construction said to reduce knife edge wear on fine-weighing beam and prolong accuracy of balance.

Instrument is temperature-compensated, provides large unobstructed access to weighing chamber, and has conveniently placed weight control knobs and oil damping.

The Torsion Balance Co., Dept. PVP, Clifton, N. J.

TORSION BALANCE

FATTY AMINES
In Commercial Quantities

Additions have been announced for a line of fatty nitrogen derivatives. Eleven products are available in commercial quantities.

Products include seven primary fatty amines trademarked Alamines, three fatty quarternary ammonium chlorides called Aliquats and a trimethylene diamine named Diam.

Primary amines are available in technical and distilled grades. They include lauryl, palmityl, cottonseed and soya fatty amines. Fatty trimethyl ammonium chlorides are derived from high purity lauryl, palmityl and coco primary amines, while Diam has a coco fatty amine base.

General Mills Chemical Division, Dept. PVP, Kankakee, Ill.

ALKYL BORIC ACIDS
With Fungistatic Properties

Three alkyl boric acids (alkyl dihydroxy boranes) have been made available in research quantities.

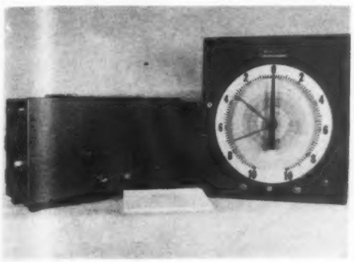
Chloropropyldihydroxyborane ($ClC_3H_6B(OH)_2$) is a white crystalline material. Dihydroxynonylborane ($C_9H_{19}B(OH_2)$) and dihydroxydodecylborane ($C_{12}H_{25}B(OH)_2$) are colorless liquids. Materials are said to be much weaker

NEW MATERIALS — EQUIPMENT

acids than unsubstituted boric acid and are stable in water solution. Anhydrides are trialkyl boroxins.

Bacteriostatic and fungistatic properties of the acids and low surface tensions of their aqueous solutions are useful. They might also be used as intermediates for the formation of organic-inorganic polymers and as gasoline additives.

Callery Chemical Co., Dept. PVP, Callery, Pa.



GARDNER

RECORDING REFLECTOMETER

Aid in Color Control

Gardner Automatic Recording Reflectometer is capable of measuring whiteness, degree of yellowness, bleaching and fading, amount of blueing, tinting strength, and other factors in color control.

Instrument comes as complete unit with Recorder and Item UX-2a Exposure Head. Mounting arrangements must be made by purchaser. Exposure Head is dust-tight. Reflectance measured as the ratio of light in the test beam relative to that in comparison beam.

Instrument may also be used to measure opacity and hiding power of films. Both magnitude and direction of color-difference can be measured in evaluating color change. Instrument also permits estimation of which of a number of samples is closest to standard.

Gardner Laboratory, Inc., Dept. PVP 5521 Landy Lane, P.O. Box 728, Bethesda 14, Md.

ACRYLIC EMULSION

With Higher Solids

Rhoplex AC-55, a modification of Rhoplex AC-33, has been developed to provide higher solids.

New product contains essentially the same acrylic polymer with a minor modification. Emulsifying system, however, is different. New emulsion said to provide wider acceptance for tube colors. Emulsion is produced in an anionic system, and has no thickener, permitting a greater degree of freedom in formulation development.

New emulsion said to be fully comparable to older one in exterior applications. Differences in flow and leveling are slight, but in favor of AC-55. Product said to show little, if any, tendency to stratify on standing, but tends to dry or skin more rapidly at the liquid level, like most concentrated emulsions.

Rohm and Haas Co., Dept. PVP, Washington Square, Philadelphia 5, Pa.

RED PIGMENTS

Pyrazolone Type

Two Pyrazolone red pigments have been developed for use in paints. Products are Plasticone Red Light 10465 and Plasticone Red Medium 10464.

The light pigment is a very opaque, bright light shade. Med-

ium shade pigment is of medium opacity and brightness. Pigment 10465 is recommended for bright shade, good opacity, excellent heat resistance and relatively good light resistance in full shade. Said to be suitable for newer enamels where high bake requirements have made formulation difficult.

Lightfast Molybdate Orange Deep 12165 may be combined with 10465 for lighter shades. Plasticone Maroon 10458 may be combined for darker shades.

Pigment, Color & Chemical Division, Sherwin-Williams Co., Dept. PVP, 260 Madison Ave., New York 16, N. Y.

ROTARY PUMP

Gas-Tight, Oil Free

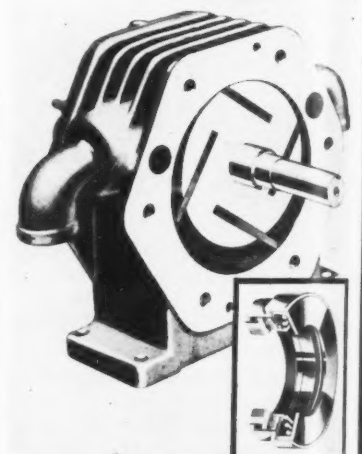
Oil-free rotary pump equipped with shaft seals for gas-tight operation at pressures up to ten psi is now available.

"Dri-Air" pump has graphite vanes and lifetime bearings, requires no lubrication in service, according to manufacturer. Shaft seals also said to require no lubrication so that pump components cannot contaminate air or gas stream.

Shaft seals make pump adaptable for handling gasses which might be harmful to personnel or equipment should they leak into surrounding areas. Constant delivery volumes and pressures provided by sliding carbon vane which seats itself by centrifugal force against inner wall of housing.

Construction normally of cast iron, but bronze or aluminum may be supplied for special applications.

The Dexter Co., Dept. PVP, Pearl River, N. J.



DEXTER

PVAc EMULSION

Gives Good Adhesion

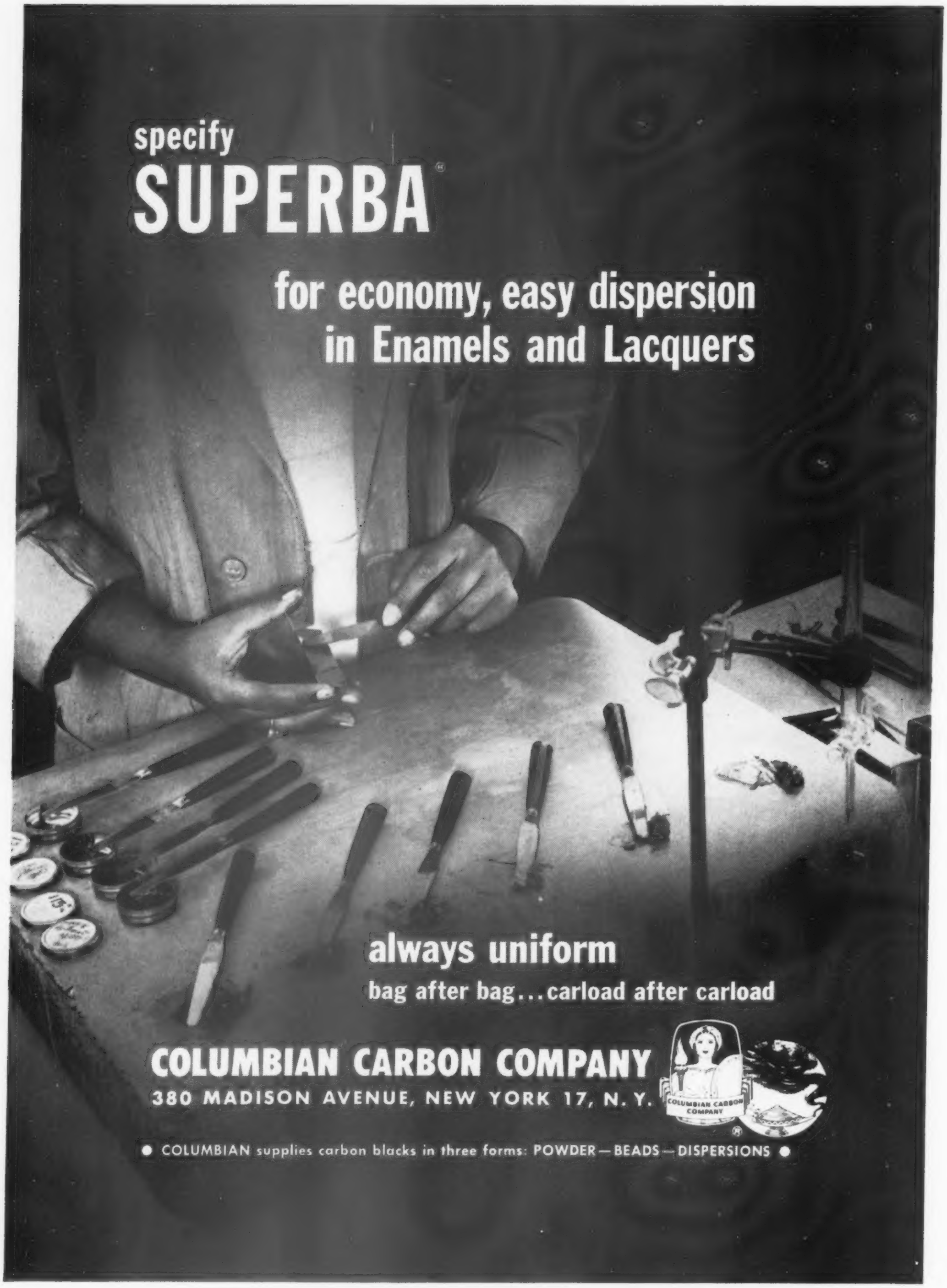
Polyvinyl chloride-acetate copolymer emulsion, said to be the first designed for good adhesion characteristics, is now being marketed.

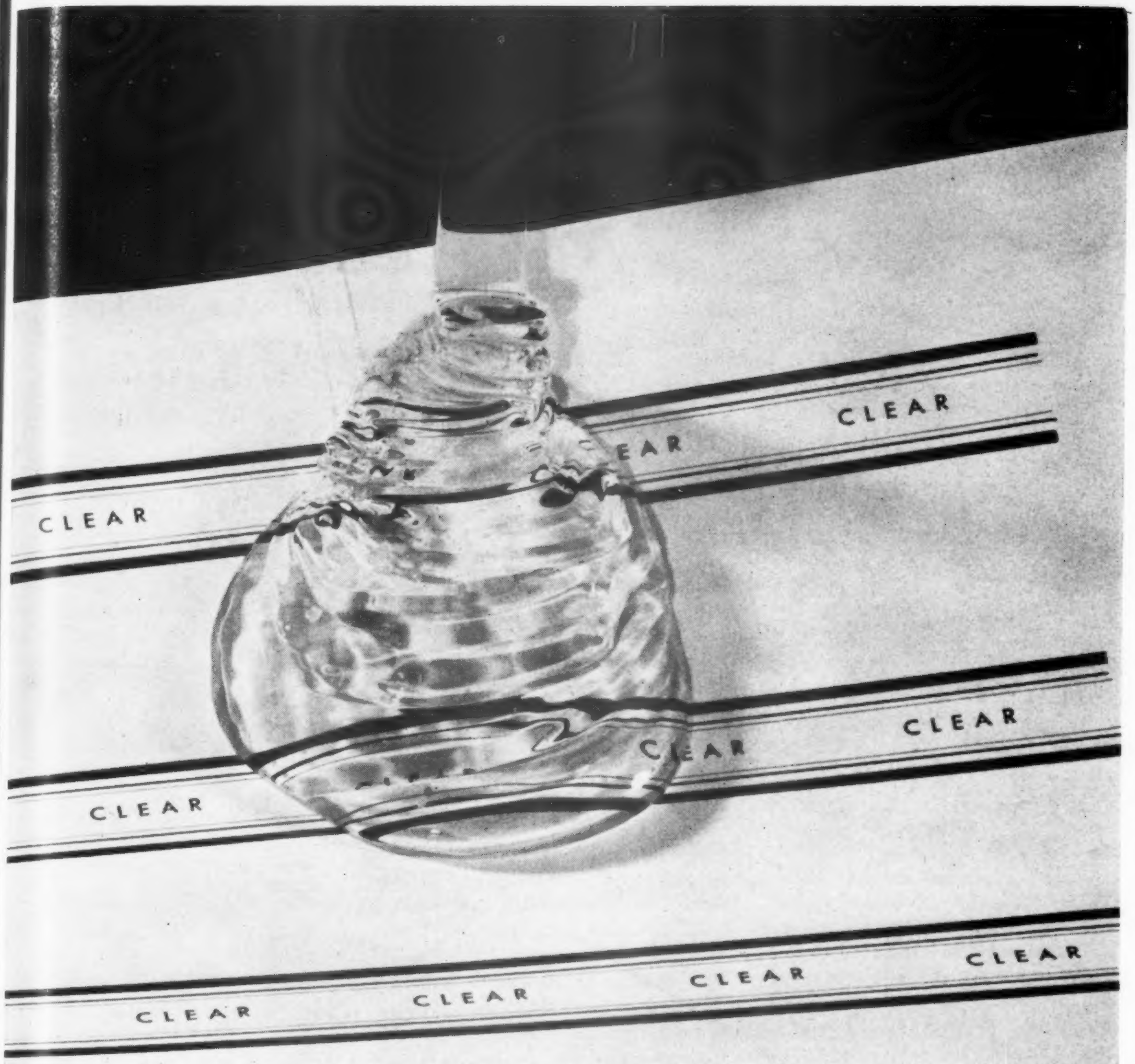
Called Resyn 2507, product is said not to require additives or thickeners to increase viscosity, nor pre-emulsification of plasticizers. Can be plasticized directly by user with monomeric plasticizers or with acrylic latices.

Provides balanced adhesion between vinyl and polar materials, while combining outstanding properties of polyvinyl chlorides and polyvinyl acetates in the wet state. Properties include good wet tack, exceptional mechanical stability, superior hold-out on porous surfaces and easy heat sealing, according to manufacturer.

National Starch Products, Inc., Dept. PVP, 270 Madison Ave., New York, N. Y.

Columbian's Branch Offices and Agents are listed on the following page


specify
SUPERBA®
for economy, easy dispersion
in Enamels and Lacquers
always uniform
bag after bag...carload after carload
COLUMBIAN CARBON COMPANY
380 MADISON AVENUE, NEW YORK 17, N. Y.
COLUMBIAN CARBON COMPANY
● COLUMBIAN supplies carbon blacks in three forms: POWDER—BEADS—DISPERSIONS ●



See why you make good lacquer with Du Pont Nitrocellulose

When you're making clear lacquer for coating metal, wood and cellophane, the nitrocellulose solutions you start with must be clear.

In the picture above, you can see that solutions of Du Pont Nitrocellulose *are* clear—free of pads, fibers and insolubles. You get these three important advantages, too:

Ample supply from expanded plant You are assured of fast delivery of high quality nitrocellulose from Du Pont. Recently expanded and modernized plant facilities greatly increased production.

Choice of wetting agents • You can get Du Pont Nitrocellulose wet with butanol, water, ethanol and isopropanol.

New Sales Development Laboratory You will share in the benefits that develop as a result of lacquer research now being conducted in a new sales development laboratory.

Get clear solutions—your choice of wetting agents—with Du Pont Nitrocellulose. For bulletin containing price and delivery information, write to E. I. du Pont de Nemours & Co. (Inc.), Explosives Dept., Wilmington 98, Delaware.

DU PONT NITROCELLULOSE

DU PONT

REG. U.S. PAT. OFF.

Better Things for Better Living
. . . through Chemistry

See the "Du Pont Show Of The Month" On CBS-TV

Cal Ink Opens New Laboratory On West Coast

THE California Ink Co. formally opened last month its new two-story research center which houses eight self-contained laboratories. According to president W. H. Brandes, Cal Ink now has the most modern research center in the coatings and ink industry. The new Research Laboratories will permit Cal Ink to expand greatly its services to the paint, printing, plastics and paper industries.

Forty of Cal Ink's research chemists, analysts and technicians are already at work in the new quarters on an accelerated program of basic research in pigments, dispersions and vehicles. Much of the research work will be in the development of new pigments and processes for Cal Ink's chemical color plant, which is the only such plant west of the Mississippi.

The firm expects to market several new diversified products in 1958, such as the lead shielding commercially produced by Cal Ink last year in cooperation with the Radiation Laboratories at Livermore, Calif.

Technical director W. C. Parle, who heads the Research Laboratories, cites the following as typical current projects:

The Dispersion Laboratory is working on a project of national importance—a new universal color dispersion suitable not only for coloring all types of paints, but also versatile enough in its properties to be used for color systems, color dispensing machines, and by painting contractors.

The Pigmentation Laboratory is working on a new product for the paint industry, which has to do with the formulation and pigmentation of certain water emulsion paints to give gloss and semi-gloss finishes.

The Research Laboratories have just completed a new process for the production of Thalo Blue and Green, and are presently working on a new type of organic yellow for the printing ink industry, and a new type of red pigment for the lithographic printing industry. They are also developing a new type of organic yellow for the paper industry.

The Printing Ink Research Laboratory is carrying on basic research in the production of several new types of ink. One of these problems has to do with aqueous types of printing ink, which should prove to be one of the most important developments in the printing ink industry for several years.

The Resin and Vehicle Laboratory is investigating new types of polymers suitable for producing new types of clear coatings for overprinting in the packaging industry. Several new types of urethane foams are being studied in this laboratory for special application. One of these applications is cold temperature insulation.

The New Products Laboratory has recently completed work on producing a flake form pigment dis-

persion for the carbon paper industry.

Second in command under Mr. Parle is Lorand Manhart, a chemical engineer who has specialized in the field of basic research in synthetic resins and surface coatings. A graduate of the University of Strasbourg in France, Mr. Manhart has been with Cal Ink for over ten years. Dr. A. M. Erskine, a full-time consultant, is another top-flight research scientist on the Cal Ink staff. Dr. Erskine is closely associated with the lead shielding project, as well as assisting on other basic research assignments.

Men in charge of each laboratory are: Ross Cummings, Analytical Research and Service Laboratory; Frank Marra, Printing Ink Research and Development Laboratory; Norman Nygard, Resin and Vehicle Research Laboratory; Morrison Chun, Chemical Pigments Laboratory; Monroe Postrel, Pigmentation Laboratory; William Schelling, Dispersion Laboratory; William Duncan, Coatings Laboratory, and Richard Lydon, New Products Laboratory.

In addition to the most modern fadometers, inkometers and other standard testing instruments, Cal Ink has installed a new Fractometer for analyzing the contents of gases. An I. D. L. Color Eye is used to establish color standards used in the paint, ink, and plastics fields. Each laboratory is equipped with laboratory roller mills, dispersion equipment, vehicle kettles, and other small-scale counterparts of the production equipment in the pilot plant and factory.

A major feature of the Research Laboratories is the large pilot plant still in process of completion. Equipped with intermediate sized equipment duplicating the large mills, kettles and dispersion machines in the factory, the pilot plant will be able to produce sufficiently large batches of newly developed materials for customers wishing to perform field evaluations with a realistic knowledge of the production cost of the material. Technical director Parle says that this will be one of the few such installations in the coatings field.

The new Research Laboratory building was designed by Michael Goodman, A. I. A., who is also on the staff of the School of Architecture of the University of California. Many of the features of the building are credited to Larry Schoof, former plant engineer who was recently promoted to production superintendent. He visited many outstanding research laboratories seeking ideas for the Cal Ink project.

In each laboratory is a complete range of utilities including gas, compressed air, vacuum, circulating hot water system, high and low pressure steam, and 110 and 220 volt power with amperage ranges up to 100. Each laboratory also has its own air circulation and exhaust system controlled by its own thermostat. A complete change of filtered air is provided every three minutes.

Another innovation is the Dial-A-Talk communications system. A chemist at work in any laboratory can answer the super-sensitive phones from a distance of up to 25 feet without interrupting his work.

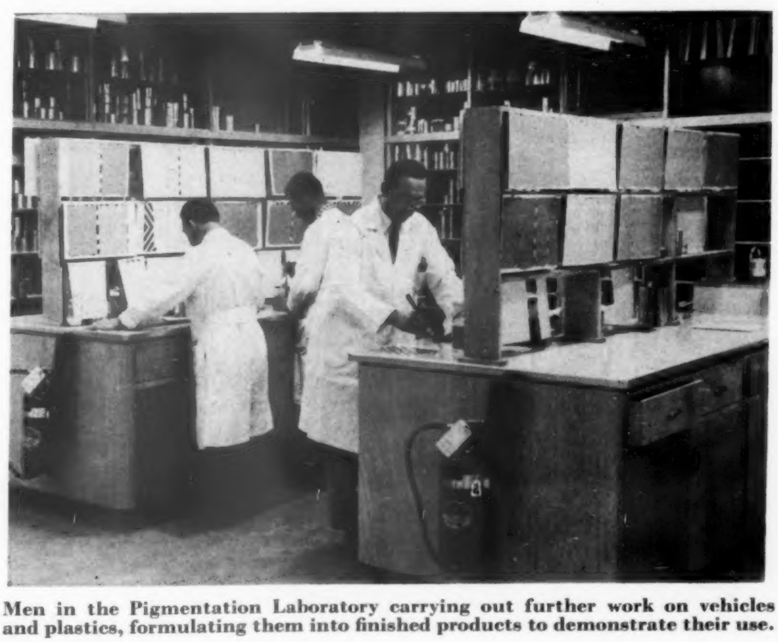
Emergency showers are located at the doorway of each laboratory. Mr. Schoof explains that this is because in the case of a serious accident, a person automatically heads for the familiar doorway.

Special attention was given to the design of storage space, working space and furniture throughout the laboratories. In the offices and conference room the furniture was custom designed by Martin Borenstein, the Berkeley, California, designer whose modern "Variations Mark II" won national acclaim in the furniture world last year.

According to Mr. Parle, the new building with its 10,000 square feet of laboratory space was planned to meet Cal Ink's requirements from now until 1975 without further expansion. Even the roof is put to use. It is the site of a large exposure testing station where vehicles, resins and pigments can be tested for weather resistance, sun fastness and resistance to salt air.

When the Research Laboratory staff moved to the new quarters, Cal Ink's plant manager, J. T. Barry, was able to expand and modernize the Production Laboratories, where 36 chemists and technicians develop ink formulations and run chemical and physical tests on all Cal Ink products and raw materials.

The Production Laboratories, under the direction of Norman Shores, consist of the Quality Control Laboratory headed by Stanley Gammon, and the Ink Formulation Laboratory, supervised by Robert Nelson. The Production Laboratories have also been supplied with the latest modern testing equipment to put their facilities on a par with those in the new Research Laboratory.



Men in the Pigmentation Laboratory carrying out further work on vehicles and plastics, formulating them into finished products to demonstrate their use.

PERSONNEL CHANGES

ENJAY COMPANY

Jack Arnold, Jr., has been named manager of the company's Boston office, it has been announced. He is to be responsible for sales and other activities in the New England area.

Mr. Arnold has been with the company since 1955, and he has served as a sales representative in New England. He had previously been an industrial salesman with the New Jersey sales division of Esso Standard Oil Co.

He is a graduate of Rice Institute, and holds a degree in Chemical Engineering.

ATLAS POWDER CO.

Theodore P. Malinowski has been appointed an assistant director of product development in the firm's chemicals division, it has been announced.

Mr. Malinowski had formerly been development manager in that division. He will head exploratory field development and marketing research sections in his newly-created position.

He joined the firm in 1956, after ten years as a development engineer in the product development department of Monsanto Chemical Co.'s plastics division. He is a graduate of Brown University.

VULCAN CONTAINERS

Lawrence M. Ferguson, sales manager, has been appointed vice president for sales, it has been announced. He succeeds **Herbert B. Scharbach,** who resigned.

L. M. Ferguson

Mr. Ferguson has been with the firm for the past 19 years. He became assistant sales manager in 1950, and sales manager in 1956.

He was instrumental in the development of the firm's Canadian market, and he has helped to direct the firm's expanded research program in the development of special interior linings for metal containers.

Eugene W. Gehm, senior sales representative for the past 11 years, has been appointed assistant sales manager, the firm has also announced.

WYANDOTTE CHEMICALS

Lewis M. Ludlow has been promoted to special technical representative attached to market development for the firm's Michigan Alkali division, it has been announced.

Mr. Ludlow has been with the company since 1950, when he became a member of the surfactant sales department. He holds a B.S. in Chemistry from Virginia Military Institute, and an M.S. in Organic Chemistry from Miami University of Ohio.

John A. Bucher has been named to replace Mr. Ludlow at his former position as sales representative on the West Coast. He joined the firm after graduation from Iowa State College with a B.S. in Chemical Engineering.

SUN CHEMICAL

Eric N. Blackstead has been elected vice president of the company and general manager of its chemicals group, it has been announced.

Mr. Blackstead had previously been vice president and general manager of Ansbacher-Siegle before that firm was acquired by the parent organization.

He is a graduate of Drexel Institute and had been chief chemist, sales service director and general sales manager of the Ansbacher-Siegle firm before becoming its vice president and general manager in 1953.

MARTIN-SENOUR

Clarence Carlson has been appointed personnel director of the firm, it has been announced by William M. Stuart, president.

Mr. Carlson had previously been associated with American Bosch Arma Corp.

GLIDDEN

LeRoy S. Fulton has become executive assistant to A.D. Duncan, vice president and general manager of the firm's paint division, it has been announced.

L. S. Fulton

Mr. Fulton is a veteran of nearly 38 years in the paint industry. He has been with the firm since 1920, when he became an accountant.

He has been an auditor, branch manager, sales manager and regional director, director of regional distribution and regional director of the Pacific region, his most recent position.

John H. Lathe, Jr., has become regional director of the firm's Pacific region, replacing Mr. Fulton, it has also been announced.

A 1943 graduate of Western Reserve University, Mr. Lathe joined the company in 1950 as manager of the central region metropolitan branches. He has been director of all branches, and in 1957 he became field manager, trade sales.

Before joining the company he had been associated with White Motor Co. of Cleveland as an administrative engineer.

Robert L. Lozon has been named general purchasing agent for the company. He has been with the firm since 1933, when he became a biller in the paint trade sales department.

In 1939 Mr. Lozon was transferred to the clerical staff of the purchasing department, and a year later he became a buyer.

BENJAMIN MOORE

F. E. Wellersdieck, director of purchases, has retired after more than 47 years of service, it has been announced.

Also announced have been the following personnel changes:

Robert C. Muhlhausen has been appointed director of purchases. **Maurice C. Workman, Jr.,** has been named assistant controller, and **Charles L. Neuberg** has become financial manager of the Los Angeles branch.

Charles H. Messerve has been named assistant general manager of the Eastern division, and **Ellis E. Snee** has become assistant sales manager of the St. Louis branch after serving in the Eastern division.

Elmer P. Christensen has been appointed assistant sales manager of the Chicago branch, and **Roland V. Wagoner** has been transferred from the St. Louis branch, where he had been assistant sales manager, to Houston, Tex., as Southwest sales activities supervisor.

Peter T. Carolan has become Eastern division purchasing agent, and **Michael Quaid** has been named credit manager in the same division.

DEWEY AND ALMY

J. Wade Miller, Jr., has been named manager of the firm's central services division, it has been announced by William L. Taggart, Jr., executive vice president.

Mr. Miller had formerly been manager of the industrial relations department. He replaces **Edward L. Mears,** who became general manager of the firm's container and chemical specialties division last April.

Mr. Miller joined the company in 1950 as personnel director, having previously been in the industrial relations department of the Ford Motor Co. He is a graduate of Washington & Jefferson College, and he holds a Ph.D. in Industrial Relations from M.I.T.

CALBAR PAINT & VARNISH

Joseph E. McCann has been named chief chemist for the firm, it has been announced by V. E. Dewees, vice president of the company.

J. E. McCann

Mr. McCann had previously been associated with the Benjamin Franklin Paint and Varnish Co. for a number of years.

He holds B.S. and M.S. degrees in Chemistry from St. Joseph's College in Philadelphia.

DEVOE & RAYNOLDS

Doran S. Weinstein has been elected president of the firm, it has been announced. He has been executive vice president and general manager since 1954, and a director since 1955.

D. S. Weinstein

Prior to joining the firm, Mr. Weinstein had been executive vice president of Capital Transit Co., Washington, D. C., and he had previously been associated with the Tampa Shipbuilding Corp., Tampa, Fla.

He is a graduate of the University of Alabama with a degree in Commerce and Business Administration. He succeeds Carl McFarlin, Sr.

ARIZONA CHEMICAL

John F. Davis has been named to the post of technical director, it has been announced.

Mr. Davis has been with the firm since 1949, and has held a variety of positions in research at the Stamford laboratories. He has recently filled marketing, administrative and technical coordinating assignments in the plastics and resins division.

He is a chemical engineering graduate of Iowa State College, and he has also attended Stevens Institute of Technology, where he received an M.S. in Organic Chemistry, and New York University, where he was awarded an M.B.A. in Marketing.

U.S.I.

Frederick J. Rich has been named alcohol production manager, it has been announced by Robert H. Cornwell, vice president in charge of production.

F. J. Rich

Mr. Rich has been with the firm since 1925. He began his service with the firm at its New Orleans plant, and has been plant manager at the alcohol and resin plant in Newark, N. J., and has also been in charge of denaturing and grain alcohol plants at Peoria and Tuscola, Ill.

He holds a B.S. in Chemistry from Johns Hopkins University, and he is a member of the American Institute of Chemical Engineers.

HERCULES

Arthur C. Ketcham, Jr., has been named manager of the Wilmington sales district, and **Charles S. Huhn** has become manager of the newly-established Atlanta district, it has been announced.

Mr. Ketcham has been with the company since 1947, when he joined the sales department of the Chicago office. He was a technical representative in the synthetics department in New York from 1950 to 1952, and was then transferred to the department's Boston office in the same capacity.

Since 1956 Mr. Ketcham had been senior technical representative for the synthetics department in Albany. He attended the University of Virginia before joining the company.

Mr. Huhn has been a technical representative in Atlanta for the past three years. Prior to that he had been in the synthetics department's Wilmington branch office as a technical service representative.

He joined the firm in 1943, after graduating from Bethany College.

ORONITE CHEMICAL

Norman E. Hathaway has been elected director and vice president—marketing, it has been announced.

Mr. Hathaway had formerly been general sales manager. He succeeds **Milton L. Baker,** who has retired. In his new position he will direct all marketing of the firm's chemical products through sales offices in the U.S. and overseas.

He has been with the firm since 1954. He had previously been with the U. S. Department of Commerce as director, chemical and rubber division, Business and Defense Services Administration. He is a graduate of the University of Maryland with a degree in Chemical Engineering.

PICCO

Nicholas C. Gangemi has become director of research for the firm, it has been announced by Dr. Paul O. Powers, vice president.

N. C. Gangemi

Mr. Gangemi has been with the company since 1946. He had previously been a research chemist for United Gas Improvement Co. He has been assistant research director since 1955.

He is a graduate of the University of Pennsylvania, where he also attended graduate school. He is a member of the American Chemical Society and a fellow of the American Institute of Chemists and the Franklin Institute.

GOODYEAR

G. C. Zwick has been appointed special field representative for the company's chemical division, it has been announced by C. O. McNeer, general sales manager of the division.

G. C. Zwick

Mr. Zwick joined the company last year with wide experience in the research and development of vinyls, polyurethanes, nitrile rubbers, resins and latices. He has undergone intensive training at the division's sales offices in Akron, Ohio.

He is a graduate of the University of Wisconsin with a B.S. in Chemical Engineering and Organic Chemistry. He is a member of the American Chemical Society.

PARAGON PAINT & VARNISH

Charles Friedman, chief chemist, has been elected vice president in charge of laboratories and production, it has been announced.

C. Friedman

Mr. Friedman has been with the firm since 1946, and has been chief chemist since 1954. He is a graduate of Purdue University and Columbia University, and he has attended New York University.

He is to be assisted by **Dr. Berthold Winston** and **Nicholas Greco.**

GENERAL ELECTRIC

Yun Jen has been appointed specialist in the company's chemical materials department product development section at Anaheim, Calif., it has been announced.

Mr. Jen, a native of China, is a graduate of the University of Shanghai, where he received a B.S. in Chemistry in 1948. He holds an M.S. in Organic Chemistry from Carnegie Institute of Technology, and an M.S. in Pulp and Paper from the College of Forestry, State University of New York.

He has had more than six years of experience in polymer and plastics research, and has filed approximately 50 records of invention and has been granted seven U. S. patents.

He has been a supervising chemist with American Cyanamid Co., and he is a member of the American Chemical Society.

UNITED WALLPAPER

Walter F. Rhoades has been named vice president of marketing, it has been announced.

Mr. Rhoades joined the firm in 1949, and has been general manager of the DeSoto Paint & Varnish division in Garland, Tex., since 1954. He had previously been technical director of the firm's Pacific Paint & Varnish division at the paint and resin laboratories at Berkeley, Calif.

MICHIGAN CHEMICAL

Dr. Donald E. Overbeek has joined the firm's research staff, it has been announced.

Dr. Overbeek has recently been associated with Stauffer Chemical Co. as a research chemist. He is a graduate of Kalamazoo College, and he obtained a doctorate in Organic Chemistry at the University of Michigan.

He is a member of the American Chemical Society.

UNION CARBIDE CHEMICALS

Eleven new employees have joined the development department in South Charleston, W. Va., it has been announced.

The new personnel are: **J. Y. Bassett, Jr.,** University of North Carolina; **J. B. Cropley,** University of Colorado; **Q. W. Decker,** Rochester Institute of Technology and University of Buffalo; **K. R. Gosnell,** West Virginia University; **B. Gumowski,** Rensselaer Polytechnic Institute and University of Rochester, and **T. L. Hebble,** Otterbein College.

Also, **R. J. Knopf,** Gettysburg College and Princeton University; **H. E. Kyle,** Purdue University; **E. A. Lavergne,** Queen's University and University of Toronto; **K. G. Soder,** University of Freiburg, Germany, and **A. D. Winquist,** University of Louisville and Columbia University.

Six men have joined the staff of the firm's Institute, W. Va., plant, it has also been announced.

The new men are: **W. F. Allen,** University of Kentucky; **R. S. Hammerness,** Valparaiso University and Columbia University; **J. A. Helm, Jr.,** North Carolina State College; **T. F. Lombard,** Cornell University; **S. G. Panayides,** University of Texas, and **W. H. Rogers,** Georgia Tech.

ARCHER-DANIELS-MIDLAND

Burton W. Schroeder has been promoted to manager of the firm's chemical products division, it has been announced. He has been assistant manager of the division since last February.


B. W. Schroeder

Mr. Schroeder is a vice president and director of the firm. He has been with the firm since 1939, when he graduated from the University of Michigan. He has been a control chemist and he has served in the research laboratory.

He became manager of the vegetable fatty acids department in 1948, after conducting market research on industrial cereals and starting the department to produce and sell those products. He headed the industrial cereals department again in 1954.

Mr. Schroeder was elected assistant vice president in 1955, and was named assistant to the president. He became a vice president and a director in 1957.

SHERWIN-WILLIAMS

E. Colin Baldwin has been elected a director of the company, it has been announced.


E. C. Baldwin

Mr. Baldwin has been with the firm since 1934, serving as assistant to the president from 1938 to 1956. In 1956 he became executive vice president of the firm's Canadian subsidiary, and last month he was elected vice president and managing director of the Canadian concern.

NATIONAL CAN

Lawrence L. Grunn has been appointed manager of the firm's Cleveland plant, it has been announced.

Mr. Grunn has been with the firm in an administrative position in production since 1953. He had formerly been with Standard Oil Co. of Ohio. He replaces Charles F. Lenhard, who has left the company.

He is a graduate of Cleveland Engineering Institute.

NEWS

Du Pont Bolsters Research

E. I. du Pont de Nemours & Co. has announced that last year it put more than 15 million dollars into its 30-year-old program of fundamental research.

The firm employs approximately 400 scientists in the search for scientific knowledge without regard to specific commercial objectives.

Studies range across organic and inorganic chemistry, biological chemicals, polymers and plastics, fibers and films, metals and alloys, elements of extraordinary purity for electronics and solar energy, to radiation chemistry and others.

Add To Polyethylene Unit

Semet-Solvay Petrochemical Division of Allied Chemical & Dye Corp. has announced the installation of new facilities for the manufacture of Atomized A-C Polyethylene in large quantities at its Buffalo, N. Y., plant.

The increased facilities now make it possible for the company to fill orders for greater amounts of the finely powdered form of A-C Polyethylene 6A and 617A grades.

Wins Farnow Contest

Charles E. Pratt of General Mills was the winner of a contest held by Farnow, Inc., at the 35th Annual Meeting of the Federation of Paint and Varnish Production Clubs held in Philadelphia October 3—November 2.

The contest consisted of estimating the number of grams of water absorbed by two bricks which were immersed in a tank of water for more than 96 hours during the Meeting. One brick was not painted, while the other was coated with an exterior flat alkyd paint based on Farnow's FAFL Alkyd Flat Vehicle.

The firm announced that Mr. Pratt's estimates of 350 grams for the uncoated brick and three grams for the coated brick were closest to the actual results. The firm said the coated brick absorbed three grams, while the uncoated brick absorbed 363 grams of water.

Suydam Marks 125th Year

The Suydam division of Pittsburgh Plate Glass Co. celebrated the 125th anniversary of its founding recently. The Suydam division has been part of Pittsburgh Plate's paint manufacturing operations since 1946.

The anniversary date was marked by the firm at a testimonial dinner for 35 of the division's employees who were honored for completing 25 or more years with the organization.

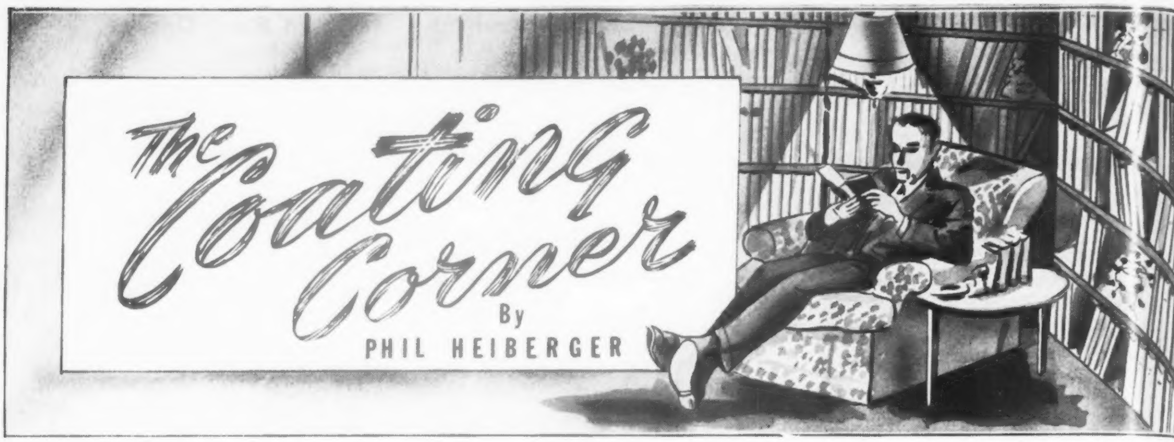
The firm was founded in 1832 as W. G. Stockton & Co., and was incorporated as the M. B. Suydam Co. in 1900. The division functions today primarily as an industrial finishes specialist.

Mexican Plant Opened

W. P. Fuller & Co. has announced that its newest international affiliate, W. P. Fuller & Co. de Mexico, S.A., has opened its factory at Ensenada, Baja California.

The Mexican affiliate will manufacture and distribute Fuller paints and allied products throughout Baja California. The venture involves both Mexican and U. S. interests.

Wulfrano Ruiz, president-treasurer of the Mexican firm, welcomed more than 500 guests at the opening ceremony, including many Mexican civil officials and American officers and stockholders of the company.



The Coating Corner

By PHIL HEIBERGER

The author continues his random reflections on various aspects of the paint industry. The opinions expressed in this column are his alone and do not necessarily reflect those of this publication.

Soul Searching

RECENT events, notably the launching of Sputniks I and II, touched off not only a tremendous amount of discussion, debate, and "blame-calling," but also—judging from the number of requests for Coating Corner comment on this subject—gnawing doubts and attacks of conscience among scientists in the paint industry.

Are they shirking their patriotic duty here? they've been wondering. Should they run, not walk, from their present non-critical jobs to others more directly concerned with national security and top-secret missile and weapon programs? If a serious shortage of scientists does exist, is it a social waste to have scientifically trained personnel engaged in evaluation of exaggerated claims, matching competitive products, modifying their own products, and doing paint-oriented research and development?

A Timely Mood

These are real and valid questions. Even in the absence of banner headlines, it's a good idea to sit back occasionally and take stock of oneself, one's job, and one's place in the scheme of things. With the present satellite-missile hysteria, now is a particularly

Phil Heiberger

appropriate moment for self and industry reappraisal.

It's no coincidence, of course, that thoughtful people throughout the country in many walks of life are posing similar questions to themselves. Each in his own way is asking, "Can I justify myself and my daily activities? Am I contributing my fair share to the welfare of my nation and the world?" Under the impetus of the Sputniks, a contemplative, critical, and analytical mood has enveloped America.

It's entirely fitting that members of our industry should share this mood. We, too, have a right, indeed, an obligation, to weigh ourselves in the balance and to conclude, with honesty, that "paint technologist" is truly a worthy and defensible calling.

Perspective

Educators, forced into conscientious soul searching by an almost constant barrage of criticism from all sides, plead earnestly for perspective. They deplore short-sighted suggestions to abandon liberal arts and humanities programs in favor of unrelieved science teaching.

Ethics, morals, truth, and beauty, they are quick to point out, give purpose and meaning to life and must not be pushed thoughtlessly aside. We must learn to make science serve us, not vice versa. Scientific achievement is merely one aspect of modern life—and should not be mistaken for the stuff of life itself.

States the *Rev. Theodore Hesburgh*, President of Notre Dame University, in an article on the aims of education which appeared in the United States Information Service's Russian language magazine, ***America***, "As a university, our specific task is to train the mind in its quest for truth. . . . .we believe that the perfecting of the mind is bound up in four basic abilities—to think clearly, to communicate one's thoughts effectively

by word and writing, to make valid judgements in conflicting matters, and to evaluate clearly what is important and unimportant in life."

Reality or Illusion?

To think clearly. It's high time somebody did some clear thinking about the so-called scientific shortage. In the considered opinion of many economists and scientists, it's only an apparent shortage, not a real one. Lack of cooperation, needless duplication of effort, senseless competition and rivalry are the culprits, they hold. Not a lack of scientific manpower resources, but rather inefficient use of same. Political bickering, non-professional management, and poor communications at all levels lower morale and reduce progress of able, well-trained scientists. In the launching of satellites and the solution of guided missile problems, as well as in all other endeavors, there's no substitute for coordinated effort, inspired leadership, and good old fashioned *esprit de corps*.

Screening for Specific Talents

Rather than indiscriminate increase of the number of scientists devoting their efforts toward the solution of critical defense problems, wider use of improved talent screening techniques is advocated. As for attempts at glamorizing science in order to attract naive youngsters of doubtful ability into scientific pursuits, let's remember this. Great unrealistic expectations lead to disillusionment and resentment, not inspired achievement. Sheer quantity won't serve our ends. Quality will.

By quality, I mean specific talent. Mathematical aptitude, so vital to space problems, for example is a rare gift. Let's recognize that science is a generic inclusive term. It encompasses numerous disciplines, each calling for different specific abilities. We now know that unusual ability in one branch of science—polymer chemistry, for instance—is by no means synonymous with unusual ability in physics, computer programming, or stress analysis.

Relatively few minds are capable of mastering and advancing the particular disciplines involved in the conquest of space. I'll venture to predict that almost none gifted in these directions have chosen paint for a career. Our talents lie elsewhere and our contributions must lie elsewhere also.

Plato's Prescription

Need we be downcast about this? Not at all. It takes all kinds to make a world and each can be justly proud of his tiny part in the many-faceted whole. Each man, said Plato more than two thousand years ago, should work at the tasks for which he is best fitted. It was a good idea then and modern industrial psychologists recognize it as a good idea today.

Matters of Importance

If we make valid judgments and evaluate clearly what is important and unimportant in life, we'll perceive immediately at least four facts: 1. Space conquest and weapons research are not the only justifiable aims and ends of scientific knowledge. 2. Space conquest and weapons research are not the only vital links in the chain of our military defense program. 3. Military problems are not the only pressing problems in America today. 4. Paint, with its dual values of protection and decoration, has much to offer toward the solution of both military and non-military (but nonetheless important) problems.

Conquest of Corrosion

Consider for a moment the corrosion problem alone as applied to warships, planes, tanks, bridges, weapons, factories, equipment, and food and medicine containers, for example. Protective coatings are indispensable. Without paint, billions of dollars worth of equipment that is now salvaged yearly would be certainly wasted. On the other hand, billions more are lost each year because of the inadequacy of present knowledge of corrosion and lack of more effective inhibitors.

Here, then, is a fertile field for fundamental, vital, meaningful research. Mathematical genius won't solve corrosion problems. Properly applied chemical genius will.

The conquest of corrosion lacks the out-of-this-world appeal of the conquest of space? Perhaps. But its importance in the preservation of essential materiel is indisputable. There's drama, too, for those imaginative enough to sense it, in pitting man's knowledge of chemistry against the destructive power of the elements.

Excitement and adventure lie ahead also in the battle against failure in weather resistance, adhesion, and color stability. Paint research not challenging? I say it is.

Protection at Home and Away

Of course, nothing has been said so far about the protection of homes, offices, automobiles, bicycles, typewriters, furniture, garden fences, traffic signs, traffic road lines, toys, refrigerators, washing machines, and what have you. Hardly an hour of the day goes by when the average American does not make use of several items whose protection is assured and decorative value enhanced, directly or indirectly, by one or more coats of correctly formulated and applied paint.

Decoration

Not to be overlooked, either, in this psychologically sophisticated age, are the morale and mental health values of gay, cheerful, soothing color combinations made possible by paint. Like music, sunshine at the window, coffee breaks, and paid vacations, paint adds much to the joy and pleasure of life (intangible social value), as well as to the efficiency and production triumphs of business and industry.

Citizenship

No, paint colleagues, we need suffer no gnawing doubts and no attacks of conscience. That way lies dissipation of our personal resources. Instead, we should mobilize our energies and direct them into more useful channels. Paint technologists we are, but responsible citizens in a great democracy we are also! Let's dismiss the soul searching questions and move ahead in the fight for improved educational opportunities, improved communications at all levels, increased freedom of scientists of all disciplines to work unhampered by politics, bickering, jealousy, and narrow, short-sighted points of view. Let's do our utmost, too, to dispel erroneous and damaging misconceptions of what science is and what scientists are like.

It's up to us to prove by word and action that all branches of science and all types of scientists have value—not just those in the headlines.

TALL OIL

(*From page 47*)

The alkyd resins were of the "long oil" type, and had the following compositions:

Alkyd Clear Composition:

(1) 23.4% phthalic anhydride
(2) 19.2% pentaerythritol
(3) 57.4% fatty acids
70% of (1) + (2) + (3) in Varsol #1
Reduced to 50% Non-Volatile for testing
Drier: 0.4% lead; 0.04% cobalt

Alkyd Enamel Composition:

Vehicle: 23.4% phthalic anhydride
19.2% pentaerythritol
57.4% fatty acids
Pigment: 100% TiO-
Pigment/Binder: 100/100
Drier: 0.4% lead; 0.04% cobalt
Thinner: Varsol #1 to 70 Krebs units

Discussion

This process for the improvement of tall oil fatty acids is simple and inexpensive. It requires no special equipment and may be performed in a common No. 316 stainless steel reaction vessel.

The distillation is a simple distillation normally carried out in industry. Temperatures and pressures are, of course, interdependent, but may vary within fairly wide related ranges provided conditions are maintained for the spearation of the tall oil fatty acids from the treated color-producing compounds and interfering anti-drying constituents.

Experimentation proved that simple distillation without prior zinc treatment does not alter the composition, the color, or the drying properties of tall oil fatty acids.

The time required for this zinc treatment will vary somewhat depending upon the temperature of treatment, the degree of agitation and the composition (particularly the quantity of anti-drying constituents and color-producing compounds) of the tall oil fatty acids.

The exact chemical natures of the color-producing compounds and of the interfering constituents responsible for the slow drying qualities of distilled tall oil fatty acids have not been established. However, this process does affect these materials. It is believed that the combination of reducing and polymerization conditions is necessary to alter these undesirable substances and render them non-volatile under the conditions of temperature and pressure suitable for the distillation of the tall oil fatty acids mixture.

Acknowledgement

The authors wish to thank Mr. A. J. Kirsch and Mr. S. Kaminowski of the Stamford Surface Coatings Laboratory of the American Cyanamid Company for the drying evaluations of the alkyd resins.

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(2) Drechsel, E. K. (to American Cyanamid Co.), U. S. Patent 2,717,890 (1955).
(3) Freeman, S. E. and Gloyer, S. W. (to Pittsburgh Plate Glass), U. S. Patent 2,423,232 (1947).
(4) Gee, W. P. (to Texaco Dev. Corp.), U. S. Patent 2,450,235 (1948).
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(6) Jones, A. L., and Foreman, R. W., Ind. Eng. Chem. **44**, 2249 (1952).
(7) Passino, H. J., Ind. Eng. Chem. **41**, 280 (1949).
(8) Potts, R. H. (to Armour and Co.), U. S. Patent 2,674,570 (1954).

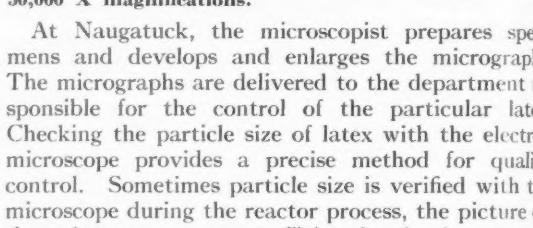
ELECTRON MICROSCOPE

(*From page 39*)

strip. The magnifications of the grating used as a reference standard are so reproducible that the magnifications quoted for the latex particles are believed to be accurate to within 3%.

Micrograph shows grating having 30,000 lines per inch. It is photographed on each end of film to insure accuracy of particle size measurement. Above micrograph shows 50,000 X magnifications.

At Naugatuck, the microscopist prepares specimens and develops and enlarges the micrographs. The micrographs are delivered to the department responsible for the control of the particular latex. Checking the particle size of latex with the electron microscope provides a precise method for quality control. Sometimes particle size is verified with the microscope during the reactor process, the picture on the microscope screen sufficing in the interests of speed.



Micrograph shows uniform size and distribution of tiny particles in Acetex 2700, vinyl acetate copolymer latex made by Naugatuck Chemical Division. Small particles increase binding capacity.

Naugatuck Chemical also uses micrographs to guide its Painesville, Ohio Plant. In this case the problem concerns polyviny chloride which is used for coated fabrics. Again the electron microscope gives quick answers on particle size and distribution, that may be obtained in no other way.

With over 50 years of service in the field of creative chemistry, Naugatuck Chemical produces a large volume of chemicals for the agricultural, textile, paint, paper, rubber, furniture, automotive, construction and many industries.

The electron microscope helped in the research and development phases of many of these products. It accurately measures the shape, size and size distribution of the tiny particles which determine the characteristics and quality of the finished product.

NEWS

Rutgers' Newark Center Announces Paint Courses

Rutgers University has announced two courses in Paint Technology which are to begin this month at the Newark Center.

Courses in fundamentals and advanced methods of Paint Technology are to be given in cooperation with the New York Paint and Varnish Production Club and the New York Paint, Varnish and Lacquer Assoc. Instructor for both courses is William Lawrence, technical director of trade sales finishes, Flood and Conklin Mfg. Co. of Newark.

The course in fundamentals begins January 27, and continues each Monday evening thereafter for 16 weeks. The advanced course begins on January 29, and continues for the same period of time each Wednesday evening. Classes for both courses are from 8:10 to 9:50 P.M. They are to be held at the Washington Park Campus of Rutgers in Newark.

Tuition for each course is $35. Checks payable to Rutgers-The State University should be mailed by January 20. Registration may be made in person at Room 212, 53 Washington St., Newark, until January 25..

The fundamental course highlights the following topics: History of Paint Development; Basic Principles of Formulation; Study of Oils, Resins and Solvents; Varnishes and Alkyd Resins; Lacquer and Emulsions; White, Colored and Extender Pigments; Driers and Addition Agents; Processing and Control Equipment; Color Matching, and Relating Products to Sales.

Highlights of the advanced course are: Latest Developments of Special Oils, Varnishes and Alkyds; Use of Epons, Vinyls and Silicones; New Types and Uses of Pigments (white, colored and extenders); Latest Methods of Pigment Dispersion, and Preparation of Emulsions and Use of Surfactants.

Also featured in the advanced course are: Formulation Principles of Architectural Coatings; Formulation of Maintenance, Industrial, Lacquer and Specialty Finishes, and Surface Preparation and Finishing Methods.

In addition to regular instruction, guest lecturers are to participate in the courses. Field trips to neighboring laboratories have also been arranged for both courses.

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Martin-Senour Package Wins

Martin-Senour Co.'s Kolor Brite spray enamel package won first place in the Paint, Enamels, Other Protective Coatings and Paint Remover category of the Annual Packaging Awards for Aerosol push-button products.

The spray enamel won out over approximately 40 competing packages in its category. Competition was conducted by the Aerosol Division of the Chemical Specialties Mfgrs. Assoc.

The overall first place honors were shared by Helena Rubinstein, Inc., for Five O'Clock perfume mist, and Rexall Drug Co. for Stag shave cream. Packages in eight categories were judged, with the winners in each category competing for the overall title.

Runners up in individual categories were not announced.

NEWS

L. Reed Brantley to Head ACS 1958 Paint Division

Professor L. Reed Brantley of the Department of Chemistry of Occidental College has been elected 1958 chairman of the American Chemical Society's Division of Paint, Plastics and Printing Ink Chemistry, it has been announced.

Professor Brantley succeeds J. Kenneth Carver of the Dayton Central Research Laboratory of Monsanto Chemical Co.

Dr. Allen L. Alexander, head of the Protective Coatings Branch of the Naval Research Laboratory, Washington, D. C., has been named chairman-elect, and Walter A. Henson of the Dow Chemical Co. has been chosen vice-chairman, it has also been announced.

Ernest R. Mueller of the Battelle Memorial Institute has been re-elected secretary-treasurer. John K. Wise of the U. S. Gypsum Co. and Ellsworth E. McSweeney of the Battelle Institute are to represent the division on the ACS Council.

Arthur K. Doolittle of Union Carbide Chemicals Co. and Professor A. C. Zettlemoyer of Lehigh University are alternate councilors, it has also been announced.

Professor Brantley is an authority on fluorine and fluorine compounds. He has also carried out important studies on the nature of adhesion and organic coatings.

He received a bachelor's degree from the University of California in 1926. He was awarded a master's degree from the California Institute of Technology in 1929, and a doctorate from the Institute in 1930.

Firm Eliminates Emulsifiers

Virtual elimination of water spotting in vinyl emulsion paint films has been claimed by Dewey and Almy Chemical Co. Division of W. R. Grace & Co. through the development of a process for producing emulsifier-free vinyl acetate polymers and copolymers.

The firm said its chemists have found a way to polymerize vinyl acetates without using emulsifiers and without detriment to the emulsions. The new process has been named the "Q" Process, the original laboratory designation.

According to Charles E. Brookes, sales manager of the firm's organic chemicals division, emulsions made through the new process promise improved wet adhesion, improved pigment binding power and greater resistance to wet rub-off.

Hercules Plant On Stream

The world's largest plant to produce polypropylene was put on stream last month, according to an announcement by Hercules Powder Co.

Located at Parlin, N. J., it is the first commercial polypropylene plant in North America, according to the company. It is to have an annual capacity of 20 million pounds.

CALENDAR OF EVENTS

Jan. 22-24. 31st Annual Meeting of Assoc. of Soap & Glycerine Producers, Waldorf-Astoria Hotel, New York, N. Y.

Feb. 27-28. Fourth Biennial Spring Symposium and Raw Material Exhibit of the Pacific Coast Paint and Varnish Production Clubs, Fairmount Hotel, San Francisco, Calif.

Mar. 5-7. Spring Meeting of Committee D-1 on Paints, ASTM, Kentucky Hotel, Louisville, Ky.

Production Club Meetings

Baltimore, 2nd Friday, Park Plaza Hotel.

Chicago, 1st Monday, Furniture Mart.

C.D.I.C., 2nd Monday.
- Cincinnati — Oct., Dec., Mar., May, Hotel Alms.
- Dayton — Nov., Feb., April, Suttmilers.
- Columbus — Jan., June, Sept., Fort Hayes Hotel.

Cleveland, 3rd Friday, Harvey Restaurant.

Dallas, 1st Thursday after 2nd Monday, Melrose Hotel.

Detroit, 4th Tuesday, Rackham Building.

Golden Gate, 3rd Monday, Sabella's Restaurant, San Francisco.

Houston, Monday prior 2nd Tuesday, Ship Ahoy Restaurant.

Kansas City, 2nd Thursday, Pickwick Hotel.

Los Angeles, 2nd Wednesday, Scully's Cafe.

Louisville, 3rd Wednesday, Seelbach Hotel.

Montreal, 1st Wednesday, Queen's Hotel.

New England, 3rd Thursday, University Club, Boston.

New York, 1st Thursday, Brass Rail, 100 Park Ave.

Northwestern, 1st Friday, St. Paul Town and Country Club.

Pacific Northwest, 3rd Thursday, Washington Athletic Club, Seattle, Wash.

Philadelphia, 3rd Wednesday, Philadelphia Rifle Club.

Pittsburgh, 1st Monday, Gateway Plaza, Bldg. 2.

Rocky Mountain, 2nd Wednesday, Republican Club, Denver, Colo.

St. Louis, 3rd Tuesday, Kings-Way Hotel.

Southern, Annual Meetings Only.

Toronto, 3rd Monday, Oak Room, Union Station.

Western New York, 1st Monday, 40-8 Club, Buffalo.

PATENTS

Complete copies of any patent or trade-mark registration reported below may be obtained by sending 50c for each copy desired (to foreign countries $1.00 per copy) to the publisher.

Wax Coating Composition

U. S. Patent 2,808,382. Eugene A. Jakaitis, Morton, Pa., assignor to The Atlantic Refining Co., Philadelphia, Pa., a corporation of Pennsylvania.

A wax coating composition consisting of between about 0.3–1.0 weight percent polyethylene, 10.0–20.0 weight percent microcrystalline wax, 56.0–83.7 weight percent paraffin wax, 5.0–15.0 weight percent technical eicosane and 1.0–3.0 weight percent petroleum oil.

Cellulose Esters

U. S. Patent 2,809,120. Arthur W. Sloan, Washington, D.C., and David J. Mann, Wharton, N. J., assignors to Atlantic Research Corporation, Alexandria, Va., a corporation of Virginia.

A composition comprising a fluid, pourable, substantially homogeneous suspension of lower fatty acid ester of cellulose in a liquid vehicle consisting essentially of high boiling plasticizer solvent which dissolves the cellulose ester readily only at elevated temperatures, the cellulose ester being in the form of solid substantially spherical, substantially non-porous particles having a maximum diameter of about 100 microns, the minimum ratio of cellulose ester to plasticizer being about 1:2.

The composition of claim 1 in which the plasticizer is selected from the group consisting of dimethyl phthalate, diethyl phthalate and ethyl phthalyl ethyl glycollate.

Polychlorotrifluoroethylene Coating

U. S. Patent 2,808,342. Mortimer H. Nickerson, Hazardville, Conn.

The method of providing articles with a continuous crack-free coating of polychlorotrifluoroethylene which comprises dispersing finely divided polychlorotrifluoroethylene in a paste forming medium having a boiling range within a range including the fusion temperature of the polymer, both chemically stable and at least partially soluble in the polymer at said temperature, applying said paste dispersion over the surface of the article to be coated, heating the coated surface to the fusion temperature of the polymer to substantially simultaneously evaporate the dispersing medium completely and fuse the polymer, and cooling the article.

Phosphate Coatings On Titanium and Zirconium

U. S. Patent 2,813,814. Edwin W. Goodspeed, Royal Oak, and Frank G. Pollard, Ferndale, Mich., assignors to Parker Rust Proof Co., Detroit, Mich., a corporation of Michigan.

The process of producing an adherent, protective coating on a surface of titanium and zirconium metals which comprises contacting a metal surface with an aqueous solution consisting essentially of manganese dihydrogen phosphate, at least about 0.05% by weight of at least one ion selected from the group consisting of titanium ions and zirconium ions, an oxidizing agent in an amount having an effect on the coating-forming ability of said solution equivalent to about 0.5% to about 1.3% of the nitrate ion and the fluoride ion in an amount in excess of the concentration of the ion selected from the group consisting of titanium and zirconium ions.

Heat Bodying Drying Oils With Dicyclopentadiene

U. S. Patent 2,812,371. Arthur Donald Green, Cranford, N. J., assignor to Esso Research and Engineering Co., a corporation of Delaware.

A process for improving a synthetic conjugated diolefinic drying oil which comprises mixing said oil with a cyclodiolefin and heating the mixture at a temperature between 200° and 300C°.

Treating Terpene Resins

U. S. Patent 2,814,610. Clinton A. Braidwood and Robert W. Hamre, Schenectady, N. Y., assignors to Schenectady Varnish Co., Inc., Schenectady, N. Y., a corporation of New York.

A process of preparing a pure terpene resin comprising polymerizing a terpene in the presence of a Friedel-Crafts catalyst, hydrolyzing the catalyst after the polymerization and then contacting the resin with a sequestering agent selected from the group consisting of hydroxy carboxylic acids, lactones of hydroxy carboxylic acids, salts of hydroxy carboxylic acids, polybasic acids and salts of polybasic acids to reduce the metal and halide content of the polymer and separating the polymer from the sequestering agent.

Wood Stains

U. S. Patent 2,813,801. Harry A. Toulmin, Jr., Dayton, Ohio, assignor to Chadeloid Corp., Dayton, Ohio, a corporation of Delaware.

A combination wood staining and filling composition comprising an azo dye in which the coupling component is chosen from the group consisting of naringenin, hesperetin and eriodictyol, and containing inert organic filler and water sufficent to form at least a 5% solution, said filler comprising an aqueous paste and wherein the filler is selected from the group consisting of asbestine, fibrous talc and wood flour, and said composition containing about 1% by weight of polyethylene glycol monolaurate based upon the liquid vehicle of the paste.

Tall Oil Paints

U. S. Patent 2,812,337. Karl Culemeyer, Hamburg-Langenfelde, Germany, assignor to Willy Spangenberg & Co., Hamburg-Eidelstedt, Germany, a company of Germany.

The process of manufacturing a drying paint base, which comprises esterifying substantially pure tall oil fatty acids with a polyhydric alcohol to produce a polyhydric alcohol ester product which contains less than one free hydroxyl group to one ester molecule and having a hydroxyl number within the approximate range of 5 to 65, and reacting the ester product with a polyisocyanate in an amount less than that corresponding to the stoichiometric relationship of one molecule of the polyisocyanate to two ester molecules and in sufficient quantity to provide isocyanate groups substantially corresponding with the number of free hydroxyl groups in the ester product.

Lead Chromate Pigment

U. S. Patent 2,813,039. John E. Bishop, Westfield, N. J., assignor to E. I. du Pont de Nemours and Co., Wilmington, Del., a corporation of Delaware.

A lead chromate pigment of improved water dispersibility containing from 0.25%-3%, based on the dry pigment, of sodium citrate.

Polish

U. S. Patent 2,812,263. Henry C. Geen, Grand Rapids, and James D. Quist, Holland, Mich., assignors, by mesne assignments, of one-half to S. C. Johnson & Son, Inc., a corporation of Wisconsin, and one-half to Simoniz Co., a corporation of Delaware.

A film forming protective composition consisting essentially of naphtha, wax, and a liquid dimethyl polysiloxane having a viscosity within a range of from 200-400 centistokes at 25°C., said dimethylpolysiloxane being present in a quantity by weight of from one part of weight of dimethyl-polysiloxane per four parts of wax, to two parts by weight of dimethyl-polysiloxane per one part by weight of wax, the major portion by weight of the composition consisting of said naphtha.

NEWS

Paint Warns of Radiation

A daylight fluorescent paint has been developed to increase the effectiveness of the radiation warning symbol which marks all radioactive materials and equipment and all areas where the danger of radiation exists.

Announcement of the new paint has been made by the U. S. Atomic Energy Commission. According to the announcement, the paint was perfected by Switzer Bros. of Cleveland.

The new paint has been designated Radiation Purple Sunbonded DAY-GLO Paint. The paint meets the requirements of the ASA Safety Color Code for vivid reddish purple, and is said to be "startlingly brighter" in daylight than the non-fluorescent purple which has been used.

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Witco Canada Builds Plant

Construction of a metallic stearate plant near Toronto has been announced by Witco Chemical Co., Canada, Ltd. The new plant will mark the first step in the firm's plans for manufacturing facilities.

Located southwest of Toronto, the plant is scheduled for completion early this year. It is to have an area of approximately 13,000 square feet, and accessibility to rail, highway and lake transportation.

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New England Club Meets

Dr. Clovis H. Adams, director of the mineral products laboratory of the Sherwin-Williams Co., and Rufus F. Wint, coordinator of the coating laboratories of Hercules Powder Co., spoke at the third meeting of the New England Paint and Varnish Production Club.

Dr. Adams spoke on "New Thoughts and Formulating Ideas in Blister-Proof Paint." He presented up to date exposure data, which were used to prove the unexcelled performance records of zinc and lead-containing oil-based paint systems.

Mr. Wint discussed newer types of gloss-retentive, fast air-drying finishes. The speaker demonstrated the excellent performance of nitrocellulose or parlon combined with acrylic esters and plasticizers.

The meeting, attended by 94 members, was held at the Hotel Beaconsfield in Boston.

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Spray Clinics Scheduled

A series of technical clinics on spray decorating techniques and new developments in automatic spray painting machines has been scheduled for five cities during January, February and March.

The clinics are being sponsored by Conforming Matrix Corp. They will be held in Cleveland at the Hotel Hollenden on January 9, in Dayton at the Hotel Van Cleve on January 23 and in Indianapolis at the Hotel Claypool on February 6. Clinics will also be held in New York at the Hotel Biltmore on February 27, and in Hartford at the Hotel Statler on March 7.

Sessions are to be held at 10:00 A.M. and 2:00 P.M. They will include industrial films and a panel of engineers to answer questions and help solve problems in the spray decorating field.

Guest cards for the clinics may be obtained from Conforming Matrix Corp., 402 Factories Bldg., Toledo 2, Ohio.

TECHNICAL Bulletins

AEROSOL FILLING

A six-page, two-color brochure illustrating aerosol filling facilities has been published by Peterson Filling and Packaging Co., Dept. PVP, Hegeler Lane, Danville, Ill.

The brochure describes and illustrates testing and analyzing customer products, storage prior to filling, filling, warehousing and shipping packaged goods.

SOLVENT EMULSIFIER

Technical Bulletin 1057-2 describes a broad range type solvent emulsifier, "Sole-Mulse B."

The two-page fact sheet lists typical properties, shipping data, uses, markets and miscellaneous uses. It has been released by Sole Chemical Corp., Dept. PVP, 27 E. Monroe St., Chicago 3, Ill.

FATTY ALCOHOLS

A one-page fact sheet on "Cachalot" brand fatty alcohols is available from M. Michel and Co., Inc., Dept. PVP, 90 Broad St., New York 4, N.Y.

The fact sheet shows typical uses for lauryl, cetyl, stearyl and oleyl alcohols.

PROPIONIC ACID

A four-page bulletin on propionic acid has been released by Union Carbide Chemicals Co., Division of Union Carbide Corp., Dept. PVP, 30 E. 42nd St., New York 17, N.Y.

The bulletin includes data on physical properties, specifications, shipping data and applications.

PLASTICS PROPERTIES

Comparative properties of General Electric's "Lexan" polycarbonate resin and other thermoplastic molding materials are outlined in a "Plastics Properties Chart" issued by the Chemical Development Dept., General Electric Co., Dept. PVP, One Plastics Ave., Pittsfield, Mass.

The chart includes data on impact strength, heat distortion points, electrical and physical properties and molding characteristics.

METAL CONTAINERS

A 20-page booklet published by The Sherwin-Williams Co. Container Division, Dept. PVP, Cleveland 1, Ohio, describes the company's metal container manufacturing facilities.

The publication also covers the specifications of containers that the firm is equipped to supply. The specification section is well-illustrated and includes line drawings showing the construction of available containers.

Detailed photos and descriptions also cover "Snap-On Clips," which eliminate the need for content-designating labels and make lithographed labels practical for all types of packaging.

A page in the booklet is devoted to reminders designed to expedite service and insure delivery in complete compliance with customer requirements.

FATTY ACIDS

"Specifications and Characteristics of Fatty Acids" is the title of a folder offered by Emery Industries, Inc., Dept. PVP, Carew Tower, Cincinnati 2, Ohio.

The folder covers the firm's line of fatty acids, including Emersol stearic and oleic acids, Hyfac hydrogenated fatty acids and glycerides, animal and vegetable fatty acids and Hyfac castor oil derivatives.

The publication also contains a listing of other Emery literature currently available.

EXTENDER PIGMENT

Two technical bulletins on Micro-Cel, an extender pigment for polyvinyl acetate paints and interior and exterior oil-based flat and semi-gloss paints, have been made available by Johns-Manville, Dept. PVP, 22 E. 40th St., New York, N.Y.

Technical Bulletin FF-6 deals with Micro-Cel for oil-based paints. Micro-Cel E is described as interesting for high flatting efficiency in both cost and weight basis. Physical properties and typical formulations are listed.

Technical Bulletin FF-[illegible]6 describes Micro-Cel C for polyvinyl acetate paint. Average physical properties are listed along with formulations for white or light tint base and medium tint base.

MATERIALS HANDLING

A presentation containing seven case studies of how manufacturers solved production, storage and shipping problems with modern materials handling equipment is available from Lewis-Shepard Products, Inc., Dept. PVP, 125 Walnut St., Watertown 72, Mass.

Case histories are fully illustrated with photos taken in plants. Equipment used includes hand lift trucks, electric fork lifts and electric "walkie" trucks. Special industrial truck attachments are also included.

PETROCHEMICALS

A 24-page general product brochure which describes the company's line of petrochemicals has been released by Amoco Chemicals Corp., Dept. PVP, 910 S. Michigan Ave., Chicago 80, Ill.

The attractively illustrated brochure includes tables of properties on all products described.

VISCOMETER

Bulletin No. V-1218 describes the Norcross viscometer for polymerization and other similar processes.

The two-page fact sheet includes illustrations and a schematic drawing of the instrument and its components. Applications, features, principles of operation and benefits are listed.

The fact sheet is available from Norcross Corp., Dept. PVP, 247 Newtonville Ave., Newton 58, Mass.

ELECTRIC FORK TRUCKS

A comparison chart now available aids potential buyers of electric fork trucks in their evaluation of various types and models.

The chart enables users to survey simultaneously the operating, design and maintenance characteristics of three different trucks by filling in appropriate categories. Such items as turning radius, lifting and lowering speeds, fork elevations, collapsed height, type of controls, capacity and braking systems are included.

Copies of the chart are being offered by Lewis-Shepard Products, Inc., Dept. PVP, Watertown 72, Mass.

SILICONE PRODUCTS

The 1958 Dow Corning Reference Guide, said to be largest and most complete silicone catalog published, is now available.

The catalog describes more than 150 commercially available Dow Corning silicone products, including many introduced during 1957. Detailed charts, tables, graphs and data on properties and performance, along with illustrated examples of effectiveness of silicones are included.

The 16-page catalog is heavily illustrated and cross-indexed for ready reference. It may be obtained from Dow Corning Corp., Dept. PVP, Midland, Mich.

HYDROCARBON EMULSION

A technical bulletin by Velsicol Chemical Corp., Dept. PVP, 330 E. Grand Ave., Chicago 11, Ill., describes Velsicol W-617 emulsion in protective and decorative coatings.

The bulletin lists formulations for interior flat paint, interior wall paint, polyvinyl acetate paint, low cost latex paint, interior latex paint, flat interior paint, decorator white interior wall paint and a tint base.

Also included are methods for testing scrubbability, flexibility, freeze/thaw, brushing, flowing and leveling, viscosity, hiding power, gloss and color. A source of raw materials is also contained.

ADVERTISERS' INDEX

CYANAMID

PRODUCT NEWS

CYAQUA* 405-20

THE STABLE ALKYD EMULSION

amazing flat paint vehicle combines best features of latices and alkyds

CYAQUA emulsion paints

- contain no organic solvents, casein or protein
- brush out evenly and easily
- clean up readily with water
- have no "stage" in the dry
- produce dead flat sheen
- have excellent adhesion
- hide well in one coat
- resist scrubbing

CYAQUA emulsion

- has unusual stability
- good freeze—thaw resistance
- has excellent emulsifying and dispersing characteristics
- disperses pigment readily, tolerates high pigment loading
- does not form irreversible solid at any drying stage
- does not clog equipment
- contains no external plasticizer, thickener, antioxidant or protein
- non-foaming
- excellent compatibility with latices

*Trademark

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